Vol. 887 Number 5

OFFICIAL GAZETTE

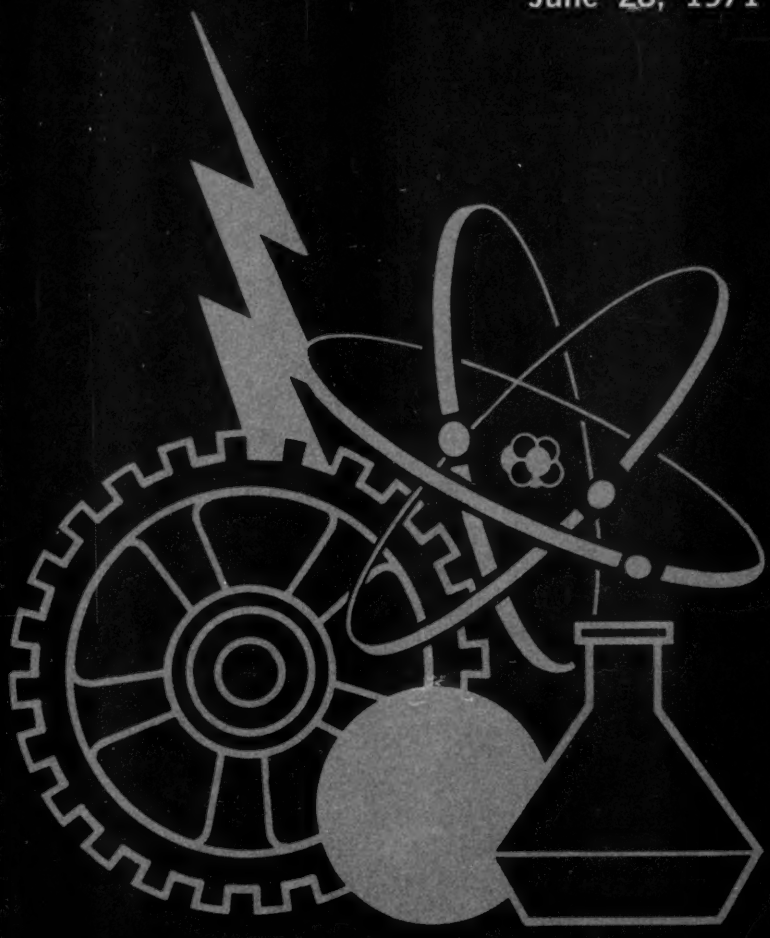
of the
UNITED STATES PATENT OFFICE

SER

A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

PATENTS

June 28, 1971



U. S. DEPARTMENT OF COMMERCE

Patent Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT OFFICE

June 28, 1971 Volume 887 Number 5

CONTENTS

Issue of June 28, 1971 1405

Condition of Patent Applications 1406

Patents Granted

General and Mechanical 1407

Electrical 1692

Index of Patentees . . . . . PI 1

Classification of

Patents . . . . . PI 45

Geographical Index of Residence of Inventors

Patents . . . . . PI 48

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $89.00 per annum, foreign mailing $22.25 additional; single copies $2.00 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $17.00 per annum, foreign mailing $4.25 additional; single copies 40 cents each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS or TRADEMARKS, price 15 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS and DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.O.

PATENT EXAMINING CORPS

R. A. WAHL, Assistant Commissioner
F. H. BRONAUGH, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JUNE 1, 1971

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-02-70
GENERAL ORGANIC CHEMISTRY, GROUP 120—I. MARCUS, Director. Heterocyclic; Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	1-01-70
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—L. J. BERCOVITZ, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	2-17-70
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—A. P. KENT, Director... Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	3-30-70
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—W. B. KNIGHT, Director... Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-05-70
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS AND RELATED ELEMENTS, GROUP 210—N. ANSHER, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Miscellaneous.	9-21-70
SECURITY, GROUP 220—R. L. CAMPBELL, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-19-70
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	5-01-70
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—W. L. CARLSON, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-27-70
PHYSICS, GROUP 280—R. L. EVANS, Director. Photography; Sound and Lighting; Indicators and Optics; Measuring and Testing; Geometrical Instruments.	2-17-70
DESIGNS, GROUP 290—R. L. CAMPBELL, Director. Industrial Arts; Household, Personal and Fine Arts.	6-17-70
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—A. BERLIN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Railways and Railway Equipment; Brakes; Rigid Flexible and Special Receptacles and Packages.	4-03-70
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders Woodworking; Tools; Cutlery; Jacks.	2-02-70
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—A. RUEGG, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	2-24-70
HEAT, POWER AND FLUID ENGINEERING, GROUP 340—C. F. GAREAU, Director. Power Plants; Combustion Engines; Fluid Motors; Pumps; Turbines; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Vaporizing; Temperature and Humidity Regulation; Machine Elements; Power Transmission; Fluid Handling; Lubrication; Joint Packing.	6-25-70
CONSTRUCTIONS, SUPPORTS, TEXTILES, CLEANING, GROUP 350—T. J. HICKEY, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Receptacles; Supports; Cabinet Structures; Centrifugal Separations; Cleaning; Coating; Pressing; Agitating; Foods; Textiles; Apparel and Shoes; Sewing Machines; Winding and Reeling.	2-02-70

Expiration of patents: The patents within the range of numbers indicated below **expire during** June 1971, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,679,645 to 2,682,657, inclusive
Plant Patents..... Numbers 1,282 to 1,287, inclusive

PATENTS

GRANTED JUNE 28, 1971

GENERAL AND MECHANICAL

3,587,113
PROCESS FOR THE PLACEMENT OF A SEALING STRIP ON A BATHING CAP, AND BATHING CAP MADE BY THE SAID PROCESS
Jeanine A. Harriague, Port-de-Lannes, Basses-Pyrenees, France
Filed Oct. 9, 1968, Ser. No. 766,159
Claims priority, application France, Oct. 10, 1967, 123,860
Int. Cl. A42b *1/12*
U.S. Cl. 2—68 **1 Claim**

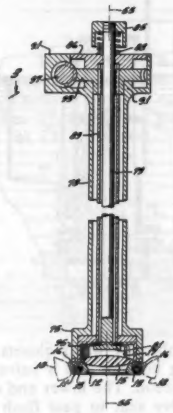
A bathing cap has a marginal edging strip and a sealing strip joined under pressure to the cap while in the raw paste condition prior to vulcanization to improve the bond between the materials.

3,587,114
HEAD COVERING
Grace E. McCourtie, Brooklyn, Mich.
Filed Apr. 12, 1967, Ser. No. 630,317
Int. Cl. A42b *5/00*
U.S. Cl. 2—207 **5 Claims**

A head covering to confine the hair suitable for use by women, particularly for drying and sleeping purposes, comprising an elongated member of fabric or the like having elastic means associated with the peripheral edges, and a contractable hole being defined in the material adjacent one end thereof wherein the other end may be inserted within the opening and maintained therein solely by frictional forces.

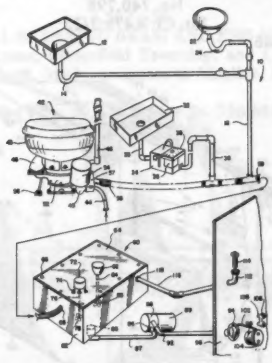
3,587,115
PROSTHETIC SUTURELESS HEART VALVES AND IMPLANT TOOLS THEREFOR
Donald P. Shiley, Santa Ana, Calif.
Continuation-in-part of application Ser. No. 547,580, May 4, 1966, now abandoned. This application Dec. 1, 1967, Ser. No. 687,249
Int. Cl. A61f *1/22*
U.S. Cl. 3—1 **49 Claims**

An inner ring carrying a check valve is rotatably mounted within an outer ring, and a series of spaced wires are confined between the rings with their free ends positioned in openings in the outer ring. Rotating the inner ring with respect to the outer ring forces the wire ends outwardly to



pierce a fabric ring and the surrounding heart tissue and then curl back towards the valve.

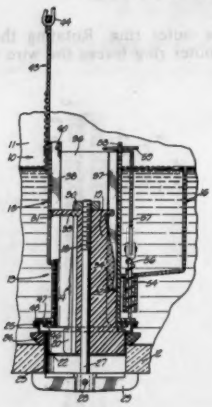
3,587,116
WASTE DISPOSAL SYSTEM
Harold G. Quase, Potomac, Md., assignor to Underwater Storage, Inc., Connecticut Ave. NW., Washington, D.C.
Continuation-in-part of application Ser. No. 710,084, Mar. 4, 1968, now Patent No. 3,528,462, Continuation-in-part of application Ser. No. 797,601, Feb. 7, 1969. Filed June 6, 1969, Ser. No. 831,141
Int. Cl. E03d *9/00, 11/00*
U.S. Cl. 4—10 **21 Claims**



An onboard waste disposal system has a main flexible drain interconnecting a toilet and a waste storage tank. Wash water from a basin, a sink and a shower base is drained into the main drain, supplying the main drain with relatively solid-free water to facilitate flow through the main drain. The large storage tank has a small motor driven agitator and a chemical additive and mixing container mounted on the top of the

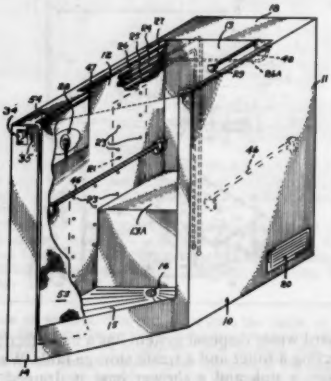
tank. An outlet of the tank leads through a motor-driven pump to a discharge port in the side of the boat. The discharge port has a fitting for securing a flexible hose to empty the storage tank into a sewage disposal facility.

3,587,117
FLUSH VALVE
Irving A. Ward, Los Angeles, Calif., assignor to Modern Faucet Mfg. Co., Los Angeles, Calif.
Filed July 17, 1968, Ser. No. 745,536
Int. Cl. E03d *1/34*
U.S. Cl. 4—55 13 Claims



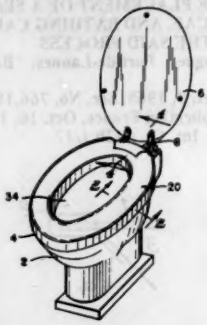
A flush valve assembly for water closets and the like including an upstanding column and a valve plug and water reservoir mounted thereon. The lower end of the valve plug cooperates with a valve seat to pass flush water when the plug is raised. When the plug is raised, the weight of the water reservoir of the assembly causes the plug to pivot and catch on the column. As flush water passes from the water closet tank, water drains from the reservoir allowing the valve plug to pivot to a normal position and drop down thereby closing the flush valve. Several embodiments of a flush valve assembly are disclosed, one of which allows adjustment of the drain rate from the water reservoir of the assembly.

3,587,118
SIT-IN SHOWER AND BATH TUB, BOTH WITH DRIERS
John R. Compton, Rockland, Maine
Continuation-in-part of application Ser. No. 556,046, June 8, 1966, now abandoned. This application May 22, 1968, Ser. No. 740,798
Int. Cl. A47k *3/22*
U.S. Cl. 4—146 20 Claims



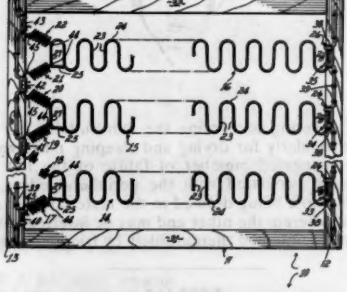
Sit-in baths having a seat with means for delivering a drying airstream against the body of a person seated on the seat, the baths are either a shower stall or a tub and the tub may have additional features contributing to safety and convenience in use, such as means to operate the drain valve from the seat and a step when the tube is of a type that is set in the floor.

3,587,119
TOILET SEAT COVER
Fredesvindo Gerena Freses, Rio Piedras, P.R.
Filed June 20, 1969, Ser. No. 835,174
Int. Cl. A47k *13/02, 13/00*
U.S. Cl. 4—242 4 Claims



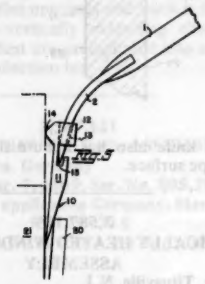
A soft and yielding cover for a conventional toilet seat having in the preferred form of the invention, an outer flexible waterproof jacket filled with a solid cushioning material and having depending side edges normally biased inwardly and having at their lower ends inturned flanges which engage under the flat lower surface of the toilet seat to hold the cover removably in place.

3,587,120
SPRING FRAME ASSEMBLY
John S. Greeno, Cincinnati, Ohio, assignor to Leggett and Platt Inc., Carthage, Mo.
Filed Oct. 11, 1968, Ser. No. 766,883
Int. Cl. A47c *23/16*
U.S. Cl. 5—260 5 Claims



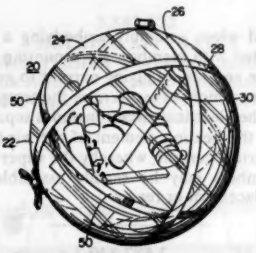
A seat or backrest subassembly to be used in the production of an item of furniture. This subassembly comprises a rectangular wooden frame and a plurality of zigzag springs extending between and connected to two opposite sides of the frame. The connection of the springs to the frame includes a pair of wires which extends along the top of the two opposite sides of the frame and are stapled thereto. The wires have hooks configurated therein through which the ends of the zigzag springs extend or through which interconnecting helical springs are connected to the frame.

3,587,121
MULTIPLE PURPOSE HAND TOOL
John A. Morrow, Salem, Oreg.
Filed Mar. 11, 1968, Ser. No. 712,139
Int. Cl. B25f 1/02
U.S. Cl. 7—12 3 Claims



A handtool including a pry bar with interchangeable accessories to render the tool additionally useful as a ram wedge, and by similar attachments, including lobed surfaces, to effectively increase the load arm lever advantage of the tool when so used.

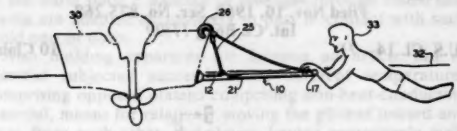
3,587,122
OCEANOGRAPHIC SPHERICAL GLASS INSTRUMENT HOUSING
Gerald R. Humphrey, Pocasset, Mass., assignor to Benthos, Inc., North Falmouth, Mass.
Filed Aug. 18, 1969, Ser. No. 850,762
Int. Cl. B63b 21/52
U.S. Cl. 9—8 10 Claims



In one embodiment an oceanographic, spherical glass instrument housing having two hemispheres placed so that the outer surfaces are flush at a seam around an equator, has a bead of a nonhardening adhesive and a tape with a nonhardening adhesive surface applied to the equatorial seam. Another embodiment has only the tape applied to the equatorial seam. Both embodiments have a bead of nonhardening adhesives applied to a covered transverse edge of the tape.

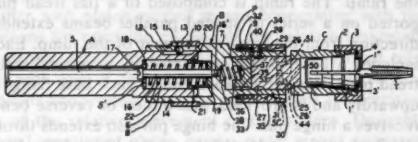
3,587,123
BOAT BOARDING DEVICE
Thomas W. O'Boyle, Constantia, N.Y.
Filed May 8, 1969, Ser. No. 822,987
Int. Cl. B63b 17/00
U.S. Cl. 9—400 3 Claims

A boat boarding platform for swimmers having longitudinally projecting inboard legs adapted to rest against the boat side near the bottom. The platform is suspended from hooks secured over the boat gunwale by flexible straps secured to the hooks at one end and to a supporting frame for the platform at the other. One pair of straps supports the inboard end of the frame at each side and another pair of straps is adjusted to support the outboard end of the frame at each side at a level under water below that of the legs so that



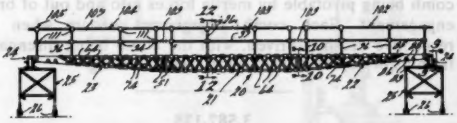
a swimmer can slide upon to the platform, then rise and step over the gunwale.

3,587,124
TOOL HOLDER
John R. Cox, Lakewood, and Joseph E. Mix, Cleveland, Ohio, assignors to the Warner & Swasey Co., Cleveland, Ohio
Filed Jan. 17, 1969, Ser. No. 792,097
Int. Cl. B23g 1/00, 5/16
U.S. Cl. 10—135 6 Claims



A tool holder for supporting a thread cutting tool on a machine tool for cutting a thread in a workpiece, the tool holder normally being supported on the machine tool slide for lineal movement therewith and the workpiece being mounted on the machine tool spindle for rotation therewith. The tool holder includes means for compensating for deviations from correct synchronization of the rotational movement of the workpiece and spindle and the axial movement of the threading tool carried by the tool holder. The tool holder further includes separate means for permitting limited reverse movement of the machine spindle prior to the start of the retracting movement of the machine slide upon completion of a threading operation without damage to the thread or tap.

3,587,125
SECTIONAL SPANNING BEAM AND END SUPPORTS
Royal R. McLeese, Bloomfield Township, and Carl N. Mortenson, Midland, Mich., assignors to Magline, Inc., Pinconning, Mich.
Filed Aug. 30, 1968, Ser. No. 756,666
Int. Cl. E01d 9/00
U.S. Cl. 14—6 19 Claims



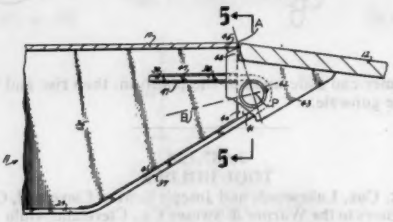
The beam is made from lightweight extruded square tubing to form a plurality of braced sections releasably joined together at their abutted ends to form a span of considerable length. The bottom runs of the sections contain a tension cable for reducing the static deflection, dampening the springboard effect, carrying a substantial portion of the tensile load and providing safety.

3,587,126

HINGE CONSTRUCTION FOR JOINING THE LIP TO THE RAMP OF A DOCKBOARD

Roderick B. Potter, Milwaukee, and Jack D. Slocum, Brown Deer, Wis., assignors to Kelley Company, Inc., Milwaukee, Wis.

Filed Nov. 10, 1969, Ser. No. 875,268
Int. Cl. B65g *11/00*
U.S. Cl. 14—71 10 Claims



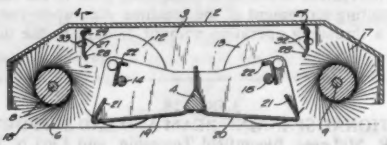
A dockboard to be installed on a loading dock and adapted to span the distance between the dock and the bed of a carrier. The dockboard included a ramp hinged at its rear edge to the dock, while an extension lip is hinged to the front edge of the ramp. The ramp is composed of a flat tread plate supported on a series of spaced parallel beams extending in a direction from the front to the rear of the ramp. Each beam includes a base flange connected by a vertical web to the tread plate, and the forward end of each base flange extends upwardly and is provided with a loop or reverse bend which receives a hinge pin. The hinge pin also extends through lugs attached to the undersurface of the lip and the hinge construction provides a greater load-supporting capacity at the joint between the lip and the ramp.

3,587,127

SWEEPER WITH INERTIA-OPERATED COMBS

Henry J. Rosendall, Grand Rapids, Mich., assignor to Bissell Inc., Grand Rapids, Mich.

Filed June 17, 1969, Ser. No. 834,060
Int. Cl. A47l *11/33*
U.S. Cl. 15—48 8 Claims



A floor sweeper having a pair of rotatable brushes, each of which is alternately driven or freely rotatable over the floor. The direction of rotation of each brush is the same at all times and is opposite to the direction of rotation of the other brush. A comb is disposed adjacent each brush, with each comb being pivotable by inertia forces into and out of brush engagement. Each comb engagement occurs when the respective brush is driven, with the comb being disengaged from its brush when the latter is freely rotating.

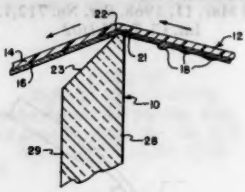
3,587,128

MONOCRYSTALLINE SCRAPING APPARATUS AND ARTICLE FOR CLEANING MAGNETIC TAPE

Salvatore Gualtieri, Massapequa; Richard Marcucci, Brooklyn, and Romolo Marcucci, all of New York, N.Y.

Filed Sept. 25, 1967, Ser. No. 670,272
Int. Cl. B08b *1/02*
U.S. Cl. 15—236 9 Claims

A magnetic tape cleaning device including a knife of monocrystalline material past which the magnetic tape is moved in contact to smooth the coating of magnetizable material. The knife also has a burnishing facet to further smooth the tape surface.

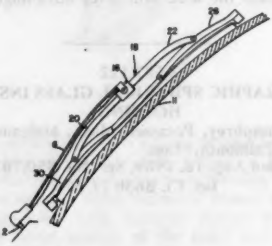


3,587,129

ELECTRICALLY HEATED WINDSHIELD WIPER ASSEMBLY

Roy E. Linker, Titusville, N.J.

Continuation-in-part of application Ser. No. 573,109, Aug. 17, 1966, now Patent No. 3,408,678. This application Nov. 4, 1968, Ser. No. 780,612
Int. Cl. B60s *1/04*; A47l *1/16*
U.S. Cl. 15—250.06 9 Claims



A windshield wiper assembly embodying a heated wiper blade is provided with members for mounting and actuating the wiper blade and for supplying current to an electrical resistance element which serves to raise the temperature of the wiper blade. The electrical circuit includes separable connections between the heating element of the wiper blade and a source of electrical current, whereby the wiper blade and the mounting members may be readily assembled or disconnected for replacement or repair.

3,587,130

STREET-CLEANING MACHINE

Werner W. Young, Oklahoma City, Okla.

Filed Sept. 4, 1969, Ser. No. 855,090
Int. Cl. E01h *1/08*
U.S. Cl. 15—352 7 Claims

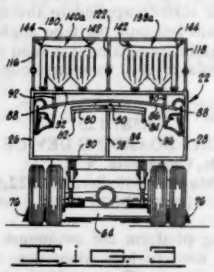
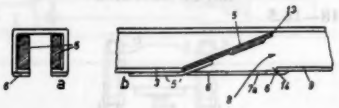


Fig. 3

A street-cleaning machine of the self-propelled vehicle type which includes frame-mounted brushes positioned for

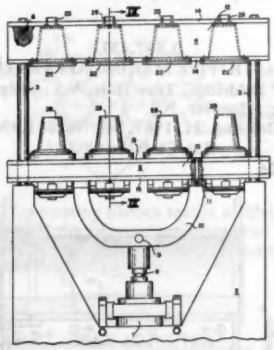
contact with the street, a vacuum assembly mounted to the rear of the brushes to receive debris therefrom, and a debris collection bin carried on the frame and receiving debris discharged from the vacuum assembly. The collection bin has at least one air outlet opening therefrom and has screen and baffle means positioned between the interior of the bin and such discharge openings. A plurality of cloth air filters are connected to the outlet openings and each is formed to contain a plurality of vertically extending channels through which fine dirt and dust are precipitated into a dust chamber located above the collection bin.

3,587,131
CURTAIN GUIDE RAIL ASSEMBLY
Peter Graf, Leinfelden, Germany
Filed Mar. 7, 1969, Ser. No. 805,292
Claims priority, application Germany, Mar. 9, 1968, P 17 29 920.6
Int. Cl. E05d *13/02;* **A47h** *15/00*
U.S. Cl. 16—95 **14 Claims**



A device for the introduction and extraction of displaceable curtain carrier elements into and out of guide rails. Openings are provided on the underside of the guide rails with yieldable secured track sections which serve to open and close said openings for the placement and removal of the carrier elements. A portable curtain rail, adapted to carry a plurality of carrier elements, may be locked onto an opening such that the elements may be inserted by means of an internal core element within the rail.

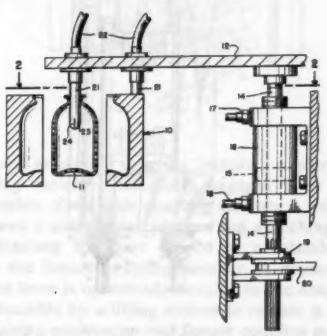
3,587,132
MOLDING APPARATUS
Jess Czetli, West Pikeland Township, Chester County, Pa., assignor to the Alan I. W. Frank Corp., Pittsburgh, Pa.
Filed Sept. 3, 1968, Ser. No. 756,798
Int. Cl. B29d *27/04*
U.S. Cl. 18—5 **12 Claims**



Molding apparatus for forming an article out of material subjected successively to different temperatures comprising a mold in which the material is formed, the mold being constituted of heat-conducting material, and means forming cooperatively with the mold a passage through which media of different temperatures are adapted successively to pass in contact with the mold so that the material in the mold is subjected successively to the temperatures of said media through the heat-conducting material of the mold, said means being of non-heat-conducting material whereby to minimize heat transfer therethrough in either direction. The mold preferably has male and female mold parts adapted for separation to permit removal of the formed article and said means preferably form cooperatively with either one or both of the mold parts a passage or passages through which said media are adapted successively to pass in contact with such mold part or parts.

Also molding apparatus for forming an article out of material subjected successively to different temperatures comprising opposed platens comprising non-heat-conducting material, means for relatively moving the platens toward and away from each other, the platens having respectively male and female portions arranged so that the male portion enters the female portion when the platens move relatively toward each other, and a male mold part of heat-conducting material disposed over the male platen portion and a female mold part of heat-conducting material disposed within the female platen portion so that when the platens move relatively toward each other the male and female mold parts form a mold for forming an article out of said material disposed in the mold with passages for said media between the made mold part and the male platen portion and between the female mold part and the female platen portion, heat transfer through the male and female platen portions being minimized due to the platens comprising non-heat-conducting material. Guide means are preferably provided for relatively guiding the platens in their relative movement toward and away from each other with platen-carried means cooperating with the guide means for precision guiding of the relative movement of the platens. Guide means may be provided in fixed relationship with one of the platens and the other platen may carry means cooperating with the guide means for precision guiding of the relative movement of the platens. Desirably the second mentioned platen carries metal means cooperating with the guide means for precision guiding of the relative movement of the platens. The guide means may be rods and the platen-carried means may be bushings guidingly receiving the rods. The platens are desirably sheathed with strong noncorrosive wear-resistant material which may be stainless steel. Self-aligning means are preferably provided insuring mating of the platens in proper cooperative relationship. Such means may comprise a yoke pivoted to the means for relatively moving the platens and connected with one of the platens.

3,587,133
APPARATUS FOR PRESSURIZING HOLLOW ARTICLES DURING MOLDING
Emery I. Valyi, Riverdale, N.Y.
Filed Apr. 10, 1968, Ser. No. 720,214
Int. Cl. B29d *23/03*
U.S. Cl. 18—5 **7 Claims**



Molding apparatus including a blow mold containing a hollow blown article having an open neck portion and a transfer device to be indexed successively into registration with the

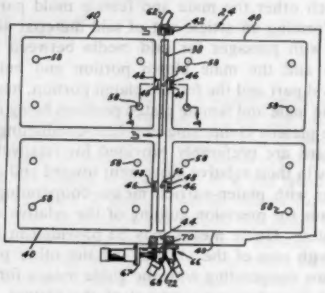
blow mold. The transfer device is brought into engagement with the open neck of the article. Fluid pressure is supplied through the transfer device for gripping the neck of the article and to apply fluid pressure to the interior of the article. The blow mold is opened to release the article and the device is advanced to extract the article and carry it to a discharge station while maintaining internal fluid pressure during the cooling step. At the discharge station the fluid pressure is reduced to allow the transfer device to release the article.

3,587,134

MOLD-CHARGING APPARATUS

Charles N. Premo, Springfield, Mass., assignor to Koehring Company, Milwaukee, Wis.

Filed Feb. 14, 1969, Ser. No. 799,445
Int. Cl. B29d *27/04*
U.S. Cl. 18—5 **6 Claims**



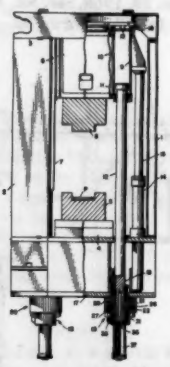
An apparatus for charging expandable thermoplastic beads to a single or multicavity mold wherein a mold face is provided with a feeder slot which is common to each cavity of said mold face, and wherein each cavity communicates with said common feeder slot through at least one filling slot which has gating means reciprocally disposed therein.

3,587,135

COMPRESSION MOLDING MACHINE

Louis F. Carrieri, La Grange Park, and Edwin A. Spanke, Oak Forest, Ill., assignors to U.S. Industries Inc., New York, N.Y.

Filed June 11, 1969, Ser. No. 832,141
Int. Cl. B30b *15/16*
U.S. Cl. 18—16 **12 Claims**



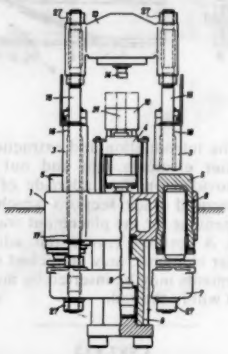
A compression molding machine wnerein an upper slide carrying an upper mold part is allowed to slide downwardly by gravity to the lower mold part mounted on the press bed and wherein pull rods thereafter pull the slide downwardly. A clamping unit at the bottom of the press, one for each pull rod, adjustably secures the lower end of the pull rod therein. The clamping units are hydraulically actuated to move a piston downwardly which in turn moves the pull rod associated therewith and the slide downwardly into contact with a hydraulically supported stop piston. By the time the actuating piston reaches the stop piston, the mold will have been filled out by the plastic therein and then further movement of the actuating piston will move the stop piston downwardly for further compression and to take up material shrinkage and produce a good finish. The actuating piston is adjustable so that the working stroke of the slide will be only that which is necessary for the particular piece being molded.

3,587,136

HYDRAULIC PRESS

Rolf Hermes, Rheydt-Giesenkirchen, Germany, assignor to Mannesmann-Meer Aktiengesellschaft, Monchengladbach, Germany

Filed Sept. 2, 1969, Ser. No. 854,624
Claims priority, application Germany, Sept. 5, 1968, P 17 77 094.4
Int. Cl. B29c *3/00*
U.S. Cl. 18—16.5 **11 Claims**



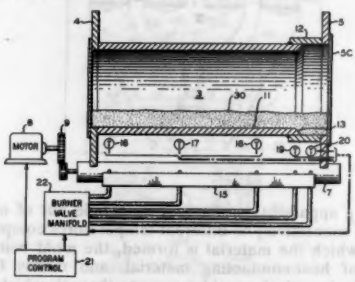
A hydraulic press is provided with a stationary press table and a movable frame structure including columns slidably movable in the table and connected above the table to a crosshead and below the table to a transom. All drive and power piston cylinder arrangements are supported by the table. The press is especially suitable for densifying powderized material, for example, metal powder.

3,587,137

PLASTIC PIPE MAKING APPARATUS

William Griff Baldridge, Troy Hills, N.J., assignor to Druid Plastics, Inc., Hanover, N.J.

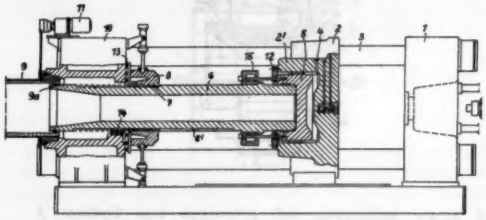
Filed Aug. 21, 1967, Ser. No. 661,996
Int. Cl. B29c *5/00*
U.S. Cl. 18—26 **7 Claims**



Plastic duct or tubing is fabricated in a rotational mold by heating the mold containing plastic powder or granules and

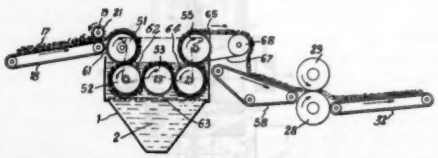
rotating the mold at speeds lower than that at which centrifugal forces become appreciable.

3,587,138
MOULD-CLOSING DEVICE
Wilhelm Bammert, Homberg, and Hans-Peter Kaiser, Dusseldorf, both of Germany, assignors to Schloemann Aktiengesellschaft, Dusseldorf, Germany
Filed July 25, 1968, Ser. No. 747,636
Claims priority, application Germany, Aug. 14, 1967, Sch41147
Int. Cl. B29f 1/00
U.S. Cl. 18—30 2 Claims



A mould-closing device in the form of a four-column hydraulic press, for injection moulding machines for moulding synthetic substances, having a stationary mould-carrying plate, and a movable mould-carrying plate capable of sliding along the column of the press and of being locked in position thereon, the movable mould-carrying plate being in the form of a cylinder slidable upon a press plunger, which is connected with a supporting column, this supporting column being provided, at the end remote from the mould-carrying plates, with annular grooves, in which there engage locking jaws, which abut on a stationary crosshead.

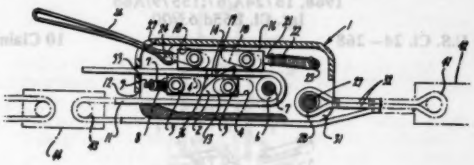
3,587,139
TREATMENT OF FIBROUS TEXTILE MATERIALS
Jacques Thibeau, Croix, France, assignor to Societe Anonyme Dite. A. Thibeau & Cie, Tourcoing (Nord), France
Filed Dec. 4, 1967, Ser. No. 687,659
Claims priority, application France, Dec. 15, 1966, Oct. 25, 1967, 87552;125765
Int. Cl. D01b 3/10
U.S. Cl. 19—66 4 Claims



Apparatus for treating fibrous textile materials with a fluid wherein a sheet of the fibrous textile material is subjected to successive and progressive drawing actions whilst being treated with the fluid.

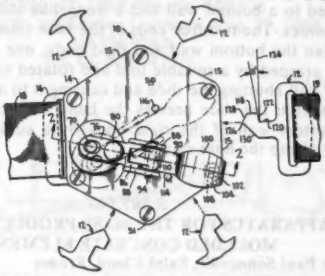
3,587,140
WEB ADJUSTER
John A. Gaylord, San Rafael, Calif., assignor to H. Koch & Sons, Inc., Corte Madera, Calif.
Filed Dec. 19, 1968, Ser. No. 791,851
Int. Cl. A44b 11/10
U.S. Cl. 24—194 8 Claims

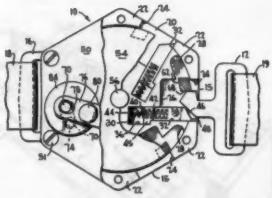
A web adjuster in which the web is played around a roller and between a pair of gripping plates urged by springs in opposite directions relatively to the web and engaging opposite faces of a branch of the web. The plates are guided for movement toward each other so as to grip the web between their adjacent faces. The plates have unidirectional gripping teeth on them with rounded tips for gripping the web when pulled in one direction, and one of the plates has a pulling strap



connected to it for manually pulling it away from the second plate to release the grip on the web for adjustment in said direction.

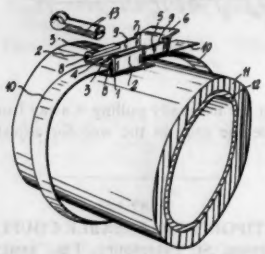
3,587,141
MULTIPOINT RELEASABLE COUPLING
George M. Brown, St. Petersburg, Fla., assignor to Sauna International, Inc., Miami, Fla.
Filed Apr. 23, 1969, Ser. No. 818,713
Int. Cl. A44b 17/00
U.S. Cl. 24—205.17 6 Claims





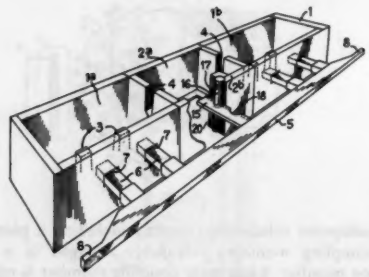
A multipoint releasable coupling including a plurality of male coupling members releasably engaged in a female coupling member. Each male coupling member is releasably locked between a sliding latch plunger and a latching tooth. All of the latching teeth are carried by a rotatable disc mounted on the female coupling member. A manually actuatable pivot lever is operatively coupled to the disc and is manually actuatable by a lifting motion to release it from a motion restraining position on said female coupling member. Subsequently, the lever arm is manually pivoted to rotate the disc and thereby remove the latching teeth from engagement with the male coupling members, thereby permitting simultaneous removal of the male coupling members from the female coupling member.

3,587,142
DEVICE FOR TIGHTENING AND CLAMPING A HOSE CLAMP ON A TUBULAR BODY OR THE LIKE
Angelo Scaravelli, Milano, Italy
Filed July 5, 1968, Ser. No. 742,923
Claims priority, application Italy, July 24, 1967, Apr. 22, 1968, 18724A/67;15579/A68
Int. Cl. B65d 63/00
U.S. Cl. 24—268 10 Claims



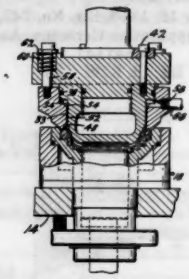
A device for tightening and clamping a hose clamp on a tubular body, the device comprising a rigid body having guides inclined to a bottom wall and a wedgelike slide movable on said guides. The two free ends of the hose clamp are inserted between the bottom wall and rigid body, one of which ends being grasped by a suitable tool and rotated to form a winding or coil abutting the slide and causing it to advance on the guides until the slide presses the band ends between it and the bottom wall of the rigid body by a sufficient force to firmly clamp the hose clamp.

3,587,143
APPARATUS FOR THE MASS-PRODUCTION OF MOULDED CONCRETE ELEMENTS
Roger Paul Sonneville, Saint Cloud, France
Filed June 18, 1968, Ser. No. 737,919
Claims priority, application France, June 22, 1967, 111,433
Int. Cl. B28b 7/16
U.S. Cl. 25—41 10 Claims



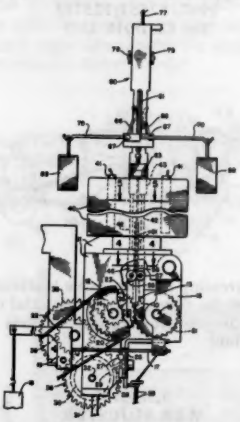
Device for an apparatus for moulding a concrete element in which hollows must be formed by pin means. A pin means-carrying device is movable relative to the mould between a position in which the pin means are inserted in the mould and a position in which the pin means are in a withdrawn position relative to the mould. Actuating means shift the pin means-carrying device between said two positions and a releasable locking device locks the pin means-carrying device in the inserted position of the pin means.

3,587,144
MULTI-SECTION MOLD WITH AIR PRESSURE EJECTION RING
Eli H. Mechling, 2881 McClain Road, Lima, Ohio 45804
Filed June 11, 1969, Ser. No. 832,355
Int. Cl. B28b 7/10
U.S. Cl. 25—118 8 Claims



Apparatus for producing clay pigeons includes an improved ejector ring for ejecting the clay pigeons from a mold cavity. In the apparatus, the ejector ring is backed up rigidly by a supporting plate during normal operation and is then moved by air pressure to eject or strip the clay pigeon from an associated mold or die section when the mold sections separate. The air also is supplied between the mold section and the clay pigeon to eliminate any vacuum and facilitate ejection of the clay pigeon.

3,587,145
CRIMPING APPARATUS WITH HEATING AND COOLING CAGE
Donald W. McKinney, Wilmington, Del., and Henry A. Sinski, Aldan, Pa., assignors to Joseph Bancroft & Sons Co., Wilmington, Del.
Filed June 19, 1969, Ser. No. 834,792
Int. Cl. D02q 1/12
U.S. Cl. 28—1.7 26 Claims

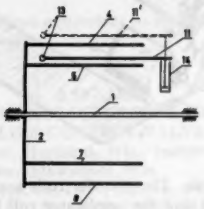


A stuffer crimper having a closed housing forming a heating chamber and a set of spaced rods supporting the core of crimped yarn and holding the core spaced from the walls of the housing. Choke members engage the sides of said core near the inlet end of said heating chamber to control the back pressure of the core. Steam under low pressure is introduced into the chamber between the walls and the core and is caused to permeate the core and act as a heat transfer agent to facilitate the setting of the crimp.

3,587,146
METHOD AND DEVICE FOR ASSEMBLING WARPS FOR FABRICS

Johannes G. M. C. H. van Luyk, and Herman Huskes, Enschede, Netherlands, assignors to Koninklyke Nedelandse Textiel-Unie N.V. Hengelo (Ov.) The Netherlands

Filed Feb. 19, 1969, Ser. No. 800,659
Claims priority, application Netherlands, Feb. 22, 1969, 6802531
Int. Cl. D02h *3/00*
U.S. Cl. 28—22 8 Claims

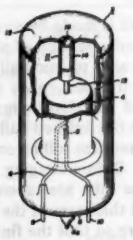


A method and apparatus for assembling warps for specimens of striped and checked fabrics. A group of threads comprising one thread of each kind and color occurring in the desired pattern is continuously wound onto a rotating body having a small winding diameter on which the said group of threads is wound and having a large winding diameter to which, at every turn or fixed number of turns, a single thread, each time selected from the group of threads in the sequence conforming to the desired pattern, is transferred.

3,587,147
METHOD FOR MAKING ELECTRIC DISCHARGE DEVICE

Cletus E. Maier, Cannelton, Ind., assignor to General Electric Company

Filed Jan. 30, 1969, Ser. No. 810,896
Division of Ser. No. 613,266, Feb. 1, 1967, Pat. No. 3,456,148.
Int. Cl. H01j *9/18, 9/36*
U.S. Cl. 29—25.15 1 Claim



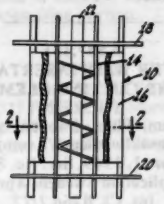
A novel method for making a discharge device, particularly a high voltage rectifier, which comprises an anode and a cathode enclosed in a glass envelope with conductive leads sealed through the envelope for making electrical connection to the anode and cathode. At least one of the leads comprises a hollow tubular member having a closed end contained in the envelope and an open end sealed to the envelope and forming a female socket for electrical connection thereto.

3,587,148
METHOD OF ASSEMBLY OF ELECTRON TUBES

Dale V. Henry, Basking Ridge, N.J., assignor to RCA Corporation

Filed Dec. 27, 1968, Ser. No. 787,382
Int. Cl. H01j *9/18, 9/36*
U.S. Cl. 29—25.16 2 Claims

A plurality of elongated tubular electron tube electrodes are disposed into nested relationship on a jig with both their leading and trailing ends being disposed relatively randomly with respect to one another. The trailing ends are gathered into a predetermined array and a first spacer plate is mounted thereon to fix the orientation of these ends. The electrodes are then removed from the jig, inverted, and

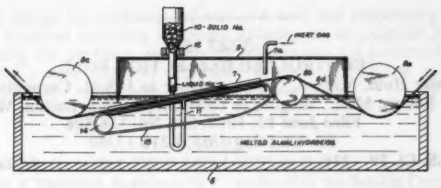


mounted on a jig with the fixed ends closest to the jig and the other ends projecting therefrom. The projecting ends are then gathered and a second spacer plate is mounted thereon to fix their orientation.

3,587,149
FURNACE INSTALLATION FOR CONTINUOUSLY DESCALING A METAL BAND

Erwin Schumann, Rossdorf, and Rudolf Kuhn, Koppern, both of Germany, assignors to Deutsche Gold-Und Silber-Scheidanstalt vormals Roessler, Frankfurt, (Main) Germany

Filed Aug. 18, 1969, Ser. No. 850,838
Claims priority, application Germany, Aug. 27, 1968, P 17 96 078.0
Int. Cl. B21c *43/04*
U.S. Cl. 29—81 5 Claims

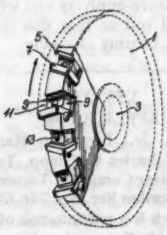


A trough is inclined in a tank of melted alkali-hydroxide and has its upper inlet end above the alkali-hydroxide. A metal band is descaled by being pulled through molten sodium contained in the trough.

3,587,150
MILLING CUTTER

Roger Menard, Roxboro, Quebec, Canada

Filed Sept. 5, 1968, Ser. No. 757,579
Int. Cl. B26d *1/12*
U.S. Cl. 29—105 4 Claims



A milling cutter for cutting kerfs or right-angular corners, comprising a disc having a central bore adapted to be mounted on a rotating spindle and provided with peripheral adjacent recesses extending across the width of the disc and

opening on the peripheral side thereof; each recess housing a cutter blade outwardly protruding from one lateral open side and from the peripheral side of each recess; said blades are arranged in a staggered relationship with respect to the lateral protruding edge of each blade and are so inclined inside said recesses as to provide a clearance angle necessary for the cutting operation.

3,587,151

ROTARY CUTTER WITH INSERTABLE CUTTING ELEMENTS AND CUTTING ELEMENT FOR USE THEREIN

Kjell Signar Nystrom, Pitea, Sweden, assignor to Svenska-Industriet-Ableringsaktiebologet, a company of Sweden

Filed Apr. 1, 1969, Ser. No. 812,106
Claims priority, application Sweden, Apr. 3, 1968, 4390/68
Int. Cl. B26d *1/12*
U.S. Cl. 29—105 **19 Claims**

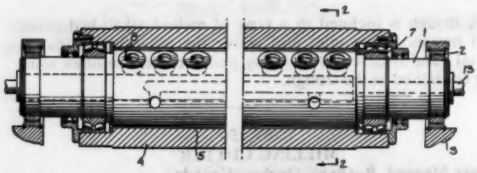
The present invention relates to a rotary cutter for the working of comparatively soft materials such as wood, board, plastics etc. More specifically the invention relates to a rotary cutter with insertable cutting elements which are arranged at the periphery of the cutter, the cutting edges of the cutting elements extending parallel or substantially parallel with the axis of rotation of the cutter.

3,587,152

CONTROLLED DEFLECTION ROLL

Peter Hold, Milford, Conn., assignor to U.S.M. Corporation, Boston, Mass., assignor to USM Corporation, Boston, Mass.

Filed June 12, 1968, Ser. No. 736,506
Int. Cl. D21g *1/02*; B21b *13/00*
U.S. Cl. 29—116 **4 Claims**



The radial-acting pressure-applying means required between the nonrotative shaft and the rotative shell encircling this shaft of a controlled deflection roll assembly, is formed by one or more pistons working in cylinders mounted by this shaft. The one or more pistons each has a hydrostatic bearing pad on its pressure-applying end which works against the inside of the shell roll so that this inside provides the runner of a hydrostatic bearing assembly.

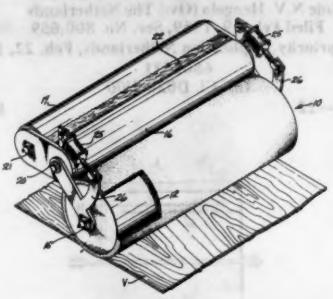
3,587,153

APPLICATOR

Charles Blickenderfer, Jr., Puyallup; Harold E. Erickson, Federal Way, and Charles C. Clapp, Tacoma, Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Continuation of application Ser. No. 746,694, July 2, 1968, now abandoned , which is a continuation of application Ser. No. 481,305, Aug. 20, 1965, now abandoned. This application Nov. 20, 1969, Ser. No. 871,710
Int. Cl. B21b *31/08*
U.S. Cl. 29—132 **12 Claims**

An applicator apparatus for placing a predetermined amount of material evenly over an uneven surface. The applicator roll has a covering of resilient material. This material has an outer barrier surface and an initial Shore Durometer of 60 or less on the 00 scale. Preferably, it is between 60 and



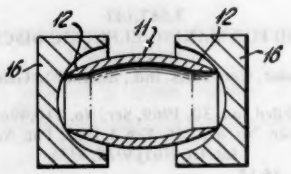
15 on the 00 scale. The transfer rolls are of hard material. The transfer roll and the applicator roll both rotate in the same direction causing a sliding contact between the rolls.

3,587,154

HOLLOW BEARING BALLS

Howell L. Potter, New Britain, Conn., assignor to Textron Inc., Providence, R.I.

Filed Apr. 1, 1969, Ser. No. 811,954
Int. Cl. B21d *53/10*
U.S. Cl. 29—148.4 **14 Claims**



A hollow bearing ball is made by swaging the annular end portions of a short tubular section of steel, or other suitable material, inward in a curve to bring all portions of each end edge relatively close together, and, if desired, thereafter welding all portions of each end edge together. Thus, the grain of the material in the finished ball follows the curvature of the ball to provide uniform rolling contact fatigue strength on all surface portions. Before swaging, the inside surfaces of the end portions of the tube are tapered at least enough to provide a uniform wall thickness in the finished ball, and are preferably tapered more so that the finished ball may have a relatively thick, heavier annular portion in a central plane that is normal to the axis through the swaged ends, thereby to provide a self-orienting effect controlling the annular position of the rotating ball.

3,587,155

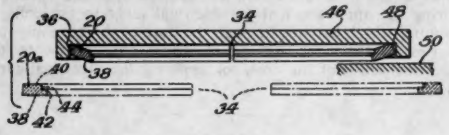
RING MANUFACTURE, PRODUCTIVE OF LINE CONTACT SEAL

Norman M. Packard, Des Plaines, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed Sept. 6, 1968, Ser. No. 757,973
Int. Cl. B23p *15/06*
U.S. Cl. 29—156.6 **7 Claims**

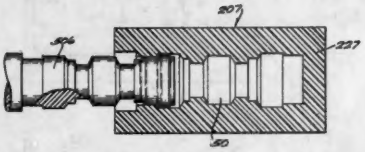
Methods, apparatus, and improved structure having as their common basis the sequence of collapsing a piston ring in a fixture approximating engine bore diameter, and lapping a locality at the side of the ring while so collapsed, until a circumferentially continuous portion—narrow in width and preferably line size—of the side is flat in the range of at least about 10 to 5 light bands. The broadest method disclosed is

the use exclusively of rings so selected that the inner peripheral edge at the side has all points thereon in



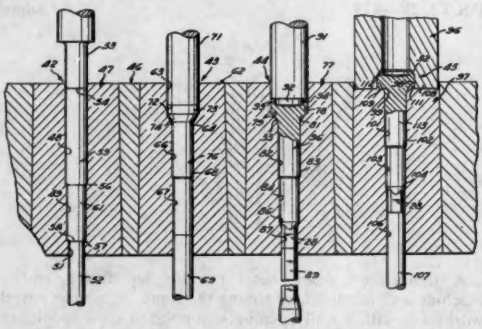
coplanarity to a degree equivalent to the stated range to seal in absolute line contact.

3,587,156
METHOD OF MANUFACTURING A PRESSURIZED FLUID CONTROL VALVE
Gerald T. Sorenson, Hartland, Wis., assignor to Systems Design Company, Inc., Milwaukee, Wis.
Filed Sept. 19, 1967, Ser. No. 668,862
Int. Cl. B21k *1/20*; B23p *13/00*; F16k *11/02*
U.S. Cl. 29—156.7 **8 Claims**



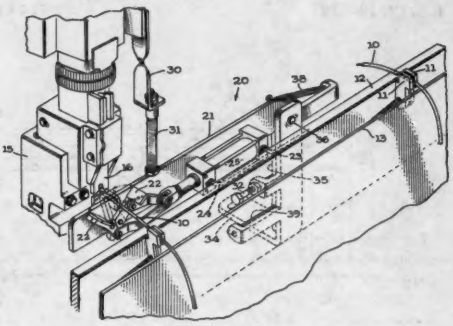
A valve for controlling the flow of pressurized fluid having a valve body including a plurality of fluid entrance and emission ports opening into a confined cavity. A valve spool is held captive in the cavity and is movable therein to control the flow of fluid selectively through the ports and the cavity. At least one of the valve members is constructed of resilient material. Such use of resilient material not only results in a unique valve structure but also permits production thereof by a unique method wherein either the valve body or the valve spool is deformed for the assembly of parts.

3,587,157
METHOD OF MAKING A VALVE STEM
James E. Mundt, Mentor, Ohio, and Milan Powell, Angola, Ind., assignors to the Weatherhead Company
Filed Nov. 20, 1967, Ser. No. 684,285
Int. Cl. B21d *53/00*; B21k *29/00*; B23p *15/26*
U.S. Cl. 29—157.1 **6 Claims**



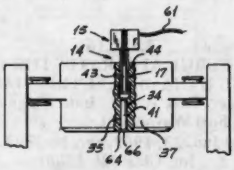
A cold forged valve stem for a three-way valve includes a conical valving portion provided by a conical skirt of work hardened material. The skirt is radially deflectable to insure proper seating and hardened to reduce wear. An oppositely facing conical valve seat is also work hardened. The valve stem is cold formed from cylindrical stock without scrap. The skirt is formed by first upsetting intermediate head and subsequently further upsetting such head while backward extruding a tubular skirt. Subsequently the tubular skirt is deformed by a conical tool to a conical shape. The opposite end of the valve stem is forward extruded to a polygonal shape to provide a wrenching portion.

3,587,158
WIRE GUIDE FOR TERMINAL ATTACHING MACHINES
Clifford J. Sullivan, 717 Price Street, Morris, Ill. 60450
Filed Sept. 22, 1969, Ser. No. 859,664
Int. Cl. H01r *43/04*
U.S. Cl. 29—203 **7 Claims**



A device for grabbing the end of a wire and positioning it for terminal attaching machines utilizing an air cylinder for closing the grabbers and having adjustments for positioning spring loaded parts to determine levels at which the wire ends are fed to the terminal attaching machines.

3,587,159
WIRE GRIP EXTRACTOR TOOL
John T. Dunkow, Bellerose, N.Y., assignor to the Bendix Corp., Teterboro, N.J.
Filed Feb. 17, 1969, Ser. No. 799,771
Int. Cl. H01r *3/00*
U.S. Cl. 29—2D3H **1 Claim**



A wire grip extractor tool for effecting manual release and extraction of a selected electrical conductor wire and attached pin or socket contactor from an electrical connector part of conventional type mating connectors such as disclosed in a U.S. Pat. No. 3,404,362 granted Oct. 1, 1968 to Dino Amendola, and assigned to The Bendix Corporation, assignee of the present invention. Each of the mating connectors may include an insulating block member in which may be positioned in suitable channels the contactor pins, while in an insulating block member of the other connector there may be positioned in other channels electrical socket contactors arranged in a mating relation with the contactor pins. The mating electrical contactors of the respective connectors may be fastened and wired in large box-type containers including thousands of such electrical connectors, with attendant printed circuit cards. Each of the electrical conductor wires and attached contactor pins or sockets are selectively positioned in the respective insulating block members so as to selectively make electrical connection in a predetermined

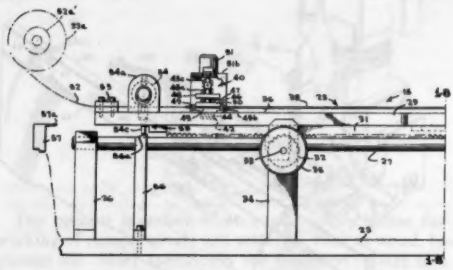
mating relation between corresponding contactor pins and sockets. Removal of the electrical conductor wires with the attached contactor pins or sockets have raised problems in the disassembly thereof from the insulating block members of such electrical connectors which the present invention seeks to overcome by the provision of a simple manually operable tool for effecting release and removal of both contactor pins and sockets with the attached conductor wires from the respective insulating block members of the electrical connectors.

3,587,160

APPARATUS FOR THREADING MATRIX CORES

John A. Raickle, Hopewell Junction, N.Y., assignor to Industrial Micronics, Inc., Leesburg, Va.

Filed June 5, 1969, Ser. No. 830,818
Int. Cl. H05k *13/04*
U.S. Cl. 29—203 **14 Claims**



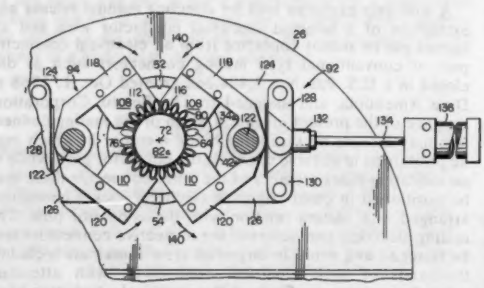
A machine for threading wires through an array of magnetic cores on filler plates or mats to form a memory matrix having a rectilinearly reciprocative carriage on which plural hollow needles are supported with their axes in parallelism and portions of the needles projecting beyond the carriage for a distance adequate to span the filler plates. The wires extend through and protrude a short distance beyond the needles and are moved unitarily with the needles and carriage through an advance stroke feeding both the needles and wires through parallel rows of the cores, after which the wires are held in tension while the needles are retracted, leaving the wires threaded through the cores, and the cores are cut adjacent the proximal edge of the array. Means are provided for rotating the needles in an oscillatory manner about their axes during advancement to facilitate feeding them through the openings in the cores and for automatically clamping and releasing the wires relative to the carriage.

3,587,161

ELECTRICAL SURGE APPARATUS FOR COMPACTING AND FORMING DYNAMOELECTRIC MACHINE COILS

Robert J. Eminger, Fort Wayne, Ind., assignor to Essex International, Inc., Fort Wayne, Ind.

Filed Jan. 23, 1969, Ser. No. 793,292
Int. Cl. H02k *15/00*
U.S. Cl. 29—205E **21 Claims**



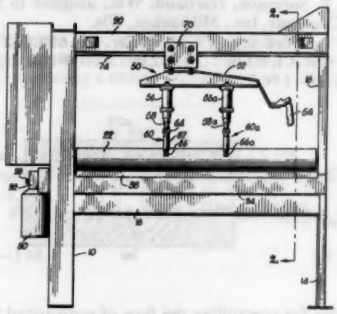
Electrical surge apparatus for compacting dynamoelectric machine coils in the slots of an internally slotted stator core member and for forming the end turn portions of the coils outwardly away from the bore of the core member, which includes a mechanism for supporting the cuff portions of slot insulators which project beyond the slots of the core member so as to inhibit the deflection and damage to the cuff portions during the application of an electrical surge to the coils. A member which extends through the bore of the core member carries contacts for making electrical connections to the electrical leads of the coils for applying the electrical surge thereto.

3,587,162

DUCT LINER FASTENING APPARATUS

Donald H. Dowdall, Kansas City, Kans.; James W. Friley, Grandview, and Daniel A. Sophy, Kansas City, Mo., assignors to Schrnenk, Inc., Kansas City, Mo.

Filed Feb. 24, 1969, Ser. No. 801,528
Int. Cl. B23p *19/04*
U.S. Cl. 29—208 **10 Claims**



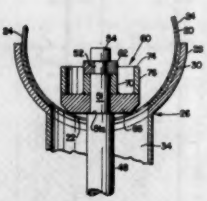
Apparatus for use in the manufacture of duct panels to complete the fabrication of each panel after initial assembly of the metal sheet and accompanying liner, the latter being applied to a surface of the sheet that has been coated with an adhesive. The liner is subjected to a pressure roll which uniformly embeds the liner in the adhesive and feeds the sheet and liner to spot welding heads where fasteners are welded to the surface covered by the liner. The feed is controlled to effect incremental advancement of the sheet and liner to successive welding positions, the heads being operated to install the fasteners during each pause in the feed.

3,587,163

METHOD FOR MAKING A CONDUIT FITTING

Richard W. Horton, Newark, Ohio, assignor to United McGill Corp., Columbus, Ohio

Filed June 12, 1968, Ser. No. 736,351
Int. Cl. B23k *31/02*
U.S. Cl. 29—479 **6 Claims**



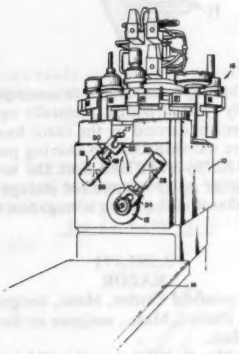
A thin-walled sheet metal conduit tap fitting and a machine and method for forming the same. A tubular barrel workpiece with a wall opening is supported on a saddlelike guide member tool having a base passage registering with but larger than the workpiece opening. A die member is pulled downwardly through the workpiece opening into the base to force and stretch the metal surrounding the opening outwardly as permitted by the larger diameter base to form a tap

flange on the barrel. The die member and the tool member base passage are dimensionally related so that the metal is initially guidingly stretched by cooperation with the guide member walls and then is freely stretched in space to form a large faired flange to which a branch conduit is readily connected. The outer surface of the stretched annular zone of the workpiece is unconfined and unguided while the annular zone is freely stretched in space. A plurality of guide members and die members enable the manufacturing of various fittings from a few standardized barrels and cylindrical taps.

3,587,164
AUTOMATIC TOOL CHANGER

Donald F. Davern, Palos Verdes Peninsula, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 8, 1967, Ser. No. 689,138
Int. Cl. B23q *3/157*
U.S. Cl. 29—568 **14 Claims**



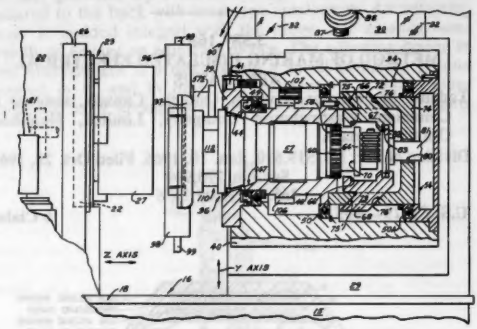
An automatic tool changer for a machine tool which includes a pair of tool change arms, each of which is respectively pivotally mounted on opposite sides of a line between a selected tool in a tool change ready position and the tool spindle. The pair of tool change arms include tool grips from a stationary retracted position to extended positions engaging respective tools in the ready position and the tool spindle. The arms then move in a translational motion to axially displace the respective displace the respective tools to disengage them from the ready position and the tool spindle respectively. The tools then move angularly while retracted to clear one another in directions to interchange the tools between the tool ready position and the tool spindle and thereafter move in a direction to axially insert the tool in the ready position and tool spindles, after which the tool change arm retracts and moves to a stationary rest position.

3,587,165
TOOL SELECTOR WITH MAGAZINE

Edward G. Griffith, West Allis, Wis., assignor to Kearney & Trecker Corporation, West Allis, Wis.

Filed Feb. 10, 1969, Ser. No. 797,812
Int. Cl. B23b *7/00*
U.S. Cl. 29—568 **4 Claims**

This invention relates to a machining center having an improved tool storage magazine selectively operative to supply code-identified tools to a tool operator. The storage magazine is journaled to rotate about a horizontal support axis and is provided with radially disposed tool sockets for receiving an intermixed combination of tools. Tool-carrying holders are releasably carried in the radial magazine sockets and are retained therein by separate, individual latches respectively associated with each magazine socket. Power-actuated means are provided to urge a latch in one direction to prevent accidental withdrawal of a tool from its socket. Likewise, each tool is releasably latched in a code-identifying position relative to a resiliently operable switch identifier fixedly carried by the magazine support. After coded identification of a tool, power-actuated means are operative to retract

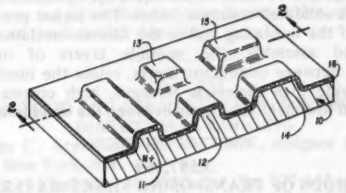


a particular latch for releasing and transferring the preselected tool to the tool operator.

3,587,166
INSULATED ISOLATION TECHNIQUES IN INTEGRATED CIRCUITS

Earl Glynn Alexander, and Walter Richard Runyan, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 26, 1965, Ser. No. 435,633
Int. Cl. B01j *12/00*; **H01l** *1/16*
U.S. Cl. 29—577 **16 Claims**

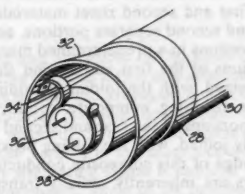


A method of forming a circuit component in a region of low-resistivity semiconductor material that is located in but isolated from a semiconductor substrate by the formation of a region of high-resistivity semiconductor material of one conductivity type in this region of low-resistivity semiconductor material of the same type. A contact is made to this low-resistivity region of the circuit component which is normally inaccessible (buried) except by a final diffusion step by making ohmic contact to the surface of the low-resistivity region. Also disclosed is the structure formed thereby.

3,587,167
METHOD OF SHIELDING OF FLUORESCENT LIGHTING FIXTURES

Berton P. Levin, Santa Monica, Calif., assignor to Sierracin Corp., Sylmar, Calif.

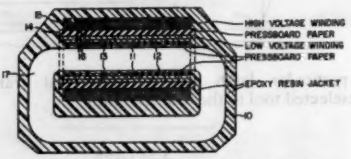
Filed Jan. 27, 1969, Ser. No. 793,953
Int. Cl. H05k *9/00*
U.S. Cl. 29—592 **8 Claims**



This patent describes a novel radio frequency shielding for fluorescent lights comprising a continuous strip of flexible

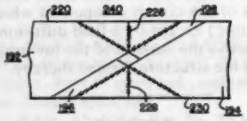
film coated with a layer which is electrically conductive and capable of transmitting light, said coated film being formed into a closure and surrounding said fluorescent light.

3,587,168
METHOD OF MAKING INSULATED ELECTRICAL APPARATUS
Tadeusz W. Kolator, London, Ontario, Canada, assignor to Canadian Westinghouse Company, Limited, Hamilton, Ontario, Canada
Division of Ser. No. 519,610, Jan. 10, 1966. Filed Oct. 28, 1968, Ser. No. 778,909
Int. Cl. H01f 7/06
U.S. Cl. 29—605 6 Claims



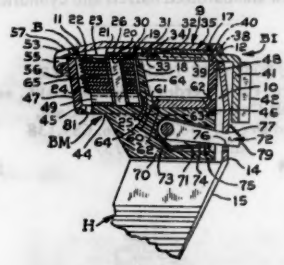
Layers of fibrous insulation are disposed between layers of conductors to provide an electrical coil assembly. The assembly is heated to drive off moisture. The dried coil is impregnated with an insulating oil. Excess oil is removed, most conveniently by heating the coil to an elevated temperature. The assembly is covered with a liquid epoxy resin and heated to from a solidified resinous jacket. The jacket prevents the escape of the insulating coil in the fibrous insulation. In the completed assembly, the multiple layers of insulation, disposed between conductor layers, retain the insulating oil and provide high dielectric strength, high corona starting levels and low dielectric losses between the conductor turns.

3,587,169
METHODS OF TRANSPOSING SHEET MATERIALS
Frank W. Benke, Sharon, Pa., and Gary E. Uitto, Niles, Ohio, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed July 5, 1968, Ser. No. 742,723
Int. Cl. H01f 7/06
U.S. Cl. 29—624 14 Claims



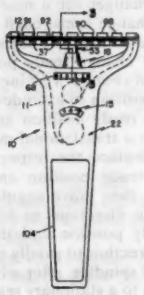
Methods of radially transposing radially adjacent electrically conductive sheet materials in an electrical winding, which include forming notches in opposite edges of the through the notch in the other. The notches are formed by cutting each of first and second sheet materials to be transposed into first and second separate portions, and folding the cut ends of the portions in a predetermined manner. The first and second portions of the first and second sheet materials are electrically joined, with the folding providing a notch in one edge of the resulting composite conductor, and the second and first portions of the first and second sheet materials are electrically joined, with the folding providing a notch in the opposite edge of this composite conductor. The composite conductors are inherently radially transposed by the method of forming them, and the transposed conductors maintain radial alignment by each proceeding through the notch in the other.

3,587,170
SAFETY RAZOR WITH DISPOSABLE BLADE MAGAZINE
Glenn T. Randol, Loch Lynn Heights, Md., P.O. Box 275, Mountain Lake Park, Md. 21550
Filed Dec. 19, 1968, Ser. No. 785,186
Int. Cl. B26b 21/24
U.S. Cl. 30—40 13 Claims



A safety razor having a disposable two-compartment blade magazine operably related with a manually operated blade-controlling mechanism carried by the razor head for displacing the new blades individually into shaving position and for transferring such blades when dull from the new blade compartment to the other compartment for storage until the new blade supply is exhausted requiring a magazine exchange.

3,587,171
RAZOR
Roger L. Perry, Lynnfield Center, Mass., assignor to The Gillette Company, Boston, Mass., assignor to the Gillette Company, Boston, Mass.
Filed May 7, 1969, Ser. No. 822,540
Int. Cl. B26b 21/26
U.S. Cl. 30—40.1 20 Claims

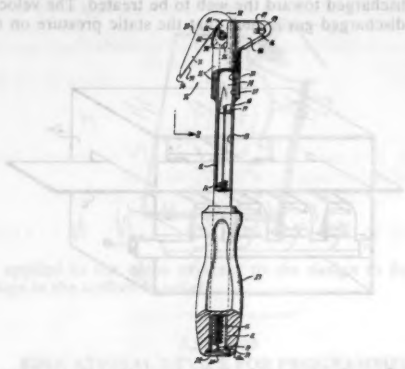


A safety razor, such as a ladies' razor, in which a shaving length of blade is supported on a flexible blade support platform, with one sharpened edge exposed, and the platform coupled to the razor handle for flexing to vary the curvature of the platform along the shaving length, thereby varying the curvature of the blade edge. The razor may also include adjusting structure for moving the platform between various curvatures and a flexible blade guard or clamp which flexes with the platform.

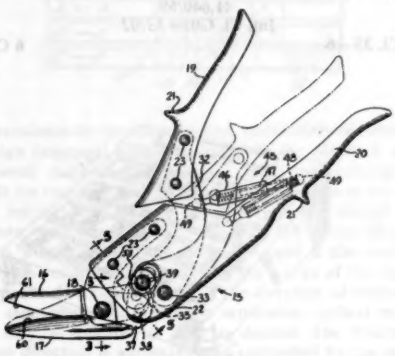
3,587,172
WIRE CUTTING TOOL
Robert O. Link, 620 West D North and George W. Morse, 9673 Melrose Avenue, Elk Grove, Calif.
Filed Mar. 4, 1968, Ser. No. 710,028
Int. Cl. B26b 13/00
U.S. Cl. 30—246 7 Claims

A wire-cutting tool having a pair of pivotally connected blades. One blade having a hooklike blade with the shank

slidably mounted and spring urged in the handle. The other blade being pivoted to extended ears on the handle. By placing the hooklike blade over a wire and pulling on the handle the blades will shear the wire.



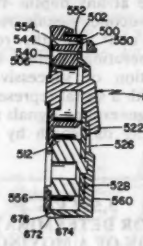
3,587,173
METAL-CUTTING SHEARS
Andrew M. Hexdall, Morris, Ill., c/o A. M. Hexdall Company
Filed Oct. 21, 1968, Ser. No. 768,994
Int. Cl. B26b *13/00*
U.S. Cl. 30—251 **11 Claims**



A metal-cutting shear with laterally offset cutting blades formed with convex cutting edges and pivoted about a bolt having tapered head, nut and locknut portions is disclosed in one embodiment. In another embodiment one centrally located blade operates between a pair of laterally spaced blades. A handle and link arrangement with fixed length rivets is provided for operating the blades of either embodiment.

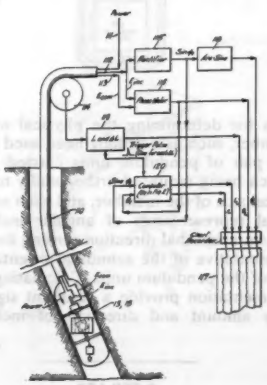
3,587,174
SAFETY RAZORS
Warren I. Nissen, Topsfield, Mass., assignor to The Gillette Company, Boston, Mass.
Continuation-in-part of application Ser. No. 658,742, Aug. 7, 1967, now Patent No. 3,375,578, dated Apr. 2, 1968, which is a continuation-in-part of application Ser. No. 618,581, Feb. 27, 1967, now abandoned , which is a continuation-in-part of application Ser. No. 579,335, Sept. 14, 1966, now abandoned. This application Mar. 29, 1968, Ser. No. 717,331
Int. Cl. B26b *21/24*
U.S. Cl. 30—346.5 **6 Claims**

A shaving geometry adjustment arrangement for a razor blade cartridge containing a continuous band of ribbonlike blade includes a back which has a shaving platform on which the blade is supported in the shaving zone and a guard bar that is molded integral with the shaving platform and secured to that platform by a flexible hinge element and a front secured to the back with snap-type connectors. An adjusting lever is molded integral with the hinge and extends rearwardly to engage an adjusting device. The adjusting device in one embodiment is a disc having a spiral camming groove formed in it, and in other embodiments is a guide plate camming lever arrangement. In one of those arrangements



the guide plate has two cam follower surfaces spaced 0.203 inch apart which cooperate with a camming surface or the camming lever which is composed of two identical sets of arcuate segments, one segment having a radius of 0.77 inch and the other segment having a radius of 0.123 inch. The guide plate is positioned at the rear of the magazine back and the camming lever, secured to the front, extends through the magazine and has a lip which overlies the guide plate and secures the guide plate to the cartridge assembly, and also provides a supplemental securing function for other components of the cartridge assembly.

3,587,175
METHOD AND APPARATUS FOR BOREHOLE DIRECTIONAL LOGGING
Fontaine C. Armistead, Darien, Conn., assignor to Texaco, Inc., New York, N.Y.
Filed Apr. 30, 1968, Ser. No. 727,141
Int. Cl. E21b *47/022;* **G01c** *9/00, 9/14, 9/06, 17/30, 19/38*
U.S. Cl. 33—205 **20 Claims**



A method and apparatus for borehole directional logging. The apparatus includes a first coil adapted for rotation about an axis aligned with the longitudinal axis of the borehole and a gimbal mounted magnetic field producing coil for generating a first magnetic field of predetermined direction with respect to the vertical in the space occupied by the first coil whereby an alternating signal is induced therein representative of the inclination angle of the borehole. A second coil is provided for rotation at the same rate as the first coil while being subjected to a second magnetic field having at least a

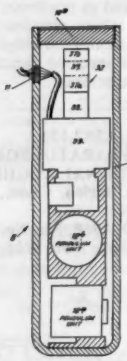
component of known azimuth direction, thereby generating an alternating signal in the second coil, the phase angle of which, with respect to the first coil signal is representative of the azimuth angle of the borehole. Computing apparatus is shown for determining the location of a selected segment of the borehole at any depth including mathematical and trigonometric function operators for generating signals representative of the incremental changes of the borehole position and of the corresponding incremental length segments along the borehole. Also included are computing elements for summing the latter signals thereby obtaining the location of the borehole at any depth. The method includes generating first and second signals representative of the borehole inclination and azimuth, respectively, and in response thereto generating signals of the incremental changes in the location of successive segments of the borehole correlated with a signal representative of the length of said segments, and generating signals representative of the borehole location along its length by summing the latter signals.

3,587,176

APPARATUS FOR DETERMINATION OF THE ORIENTATION OF A MOVING MEMBER, PARTICULARLY A DRILLING HEAD

Pierre Schnerb, Garches, France, assignor to Association Des Ouvriers en Instruments De Precision, Paris, France

Filed Aug. 12, 1968, Ser. No. 751,959
Claims priority, application France, Aug. 17, 1967, 118007
Int. Cl. G01c *9/16*; E21b *47/00*
U.S. Cl. 33—205 **8 Claims**



Apparatus for determining the physical orientation of a moving member, such as a drilling head used in well drilling, including a pair of pendulum units carried by the moving member, each being mounted orthogonally to the other and to the vertical axis of the member, and each adapted to transmit a signal representative of angular inclination to the horizontal. An azimuthal direction sensing device provides a signal representative of the azimuthal orientation of a pivot axis of one of the pendulum units. Calculating means and related instrumentation provide a resultant signal representative of the amount and direction of inclination of the member.

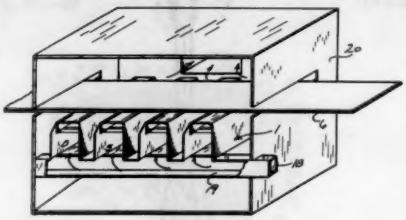
3,587,177

AIRFOIL NOZZLE

William F. Overly, Winneconne, and Kenneth J. Pagel, both of Neenah, Wis., assignor to Overly, Inc., Neenah, Wis.

Filed Apr. 21, 1969, Ser. No. 817,834
Int. Cl. F26b *13/20*
U.S. Cl. 34—156 **8 Claims**

For the treatment of surfaces such as a web of material to be cleaned, dried or stabilized without physical contact with the web, an airfoil nozzle is provided from which cleaning, drying or stabilizing gas is discharged tangentially against the web. The nozzle extends across the web to be treated and consists of a foil having a defined radius at the nozzle discharge area and a foil plate which extends along one side of the foil in a direction tangential to the foil to provide a restricted passage between the plate and foil from which the gas is discharged toward the web to be treated. The velocity of the discharged gas is such that the static pressure on the side of the web adjacent the foil is lower than the pressure on the opposite side of the web so that the web is forced by the differential in pressures toward the airfoil and rides on the gas cushion provided by the discharged gas tending to follow the radius of curvature of the foil.

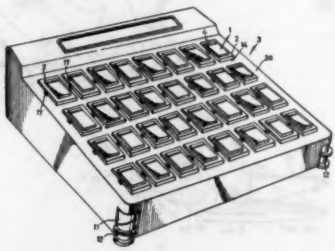


3,587,178

MEMORY-EXERCISING DEVICE

Tsuneji Kojima, 65-2 chome, Higashi-Sugi-Machi, Kita-ku, Nagoya-shi, Japan

Filed Oct. 21, 1969, Ser. No. 868,167
Claims priority, application Great Britain, Aug. 20, 1969, 41,640/69
Int. Cl. G09b *13/02*
U.S. Cl. 35—6 **6 Claims**



A memory-exercising device including a keyboard with a plurality of pushbuttons each of which has an indicia thereon, each pushbutton being mechanically connected to an indicator plate containing an indicia thereon corresponding to the indicia on the pushbutton so that when a pushbutton is depressed the indicating plate swings upwardly so that the indicia thereon becomes exposed to view.

3,587,179

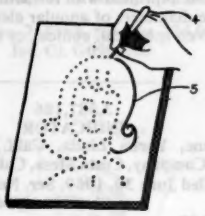
METHOD FOR PRODUCTION OF ORNAMENTAL DESIGN IN PLASTIC OBJECT

Evalin T. Oeswein, 3803 Grandview Ave., Louisville, Ky.

Filed Aug. 29, 1968, Ser. No. 756,175
Int. Cl. G09b *11/00*
U.S. Cl. 35—26 **2 Claims**

A method for production of an ornamental design in intaglio or relief in a selected surface of an article of foamed or expanded plastic object where the selected design is transferred to the surface of the object and a selected solvent is applied to the surface to melt the plastic in selected locations so the plastic collapses to form the outline of the design in

the surface. The solvent can be applied directly to the design to form the design in the surface in intaglio or the solvent can

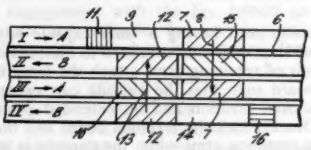


be applied to the areas adjacent to the design to form the design in the surface in relief.

3,587,180
EDUCATIONAL DEVICE FOR PROGRAMMED INSTRUCTION

Hubert Richt, Socking, Germany, assignor to Sueddeutsche Mechanische Werkstatten Wolf FRHR. von Hornstein Kommanditgesellschaft, Munich, Germany

Filed Aug. 4, 1969, Ser. No. 847,169
Int. Cl. G09b *5/04*; **G11b** *5/86*
U.S. Cl. 35—35c **5 Claims**

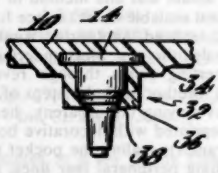


To reinforce the learning process, particularly in respect to a foreign language, a student listens to the playback of instructional material recorded on tape and subsequently records his response thereto on appropriate areas of the tape. If the instructional material is stored on and played back from one track of a multiple-track tape fed in one direction through a bidirectional tape recorder, and if the student's response is recorded on another of the tracks of the tape in the opposite direction, reversal of the direction of movement of the tape after each operation represents cyclical motion which may be repeated as often as desired. The reversal of the tape direction is automatic and controlled by cue marks recorded adjacent to the entries. The length of each cycle, and the number of repetitive cycles can be regulated manually as well as automatically.

3,587,181
SHOES WITH CLEATED BOTTOMS

Louis E. Bernier, Rockland, and James P. Giblin, Milton, Mass., assignors to E. T. Wright & Co., Inc., Rockland, Mass.

Filed June 9, 1969, Ser. No. 831,373
Int. Cl. A43b *23/28*
U.S. Cl. 36—59R **11 Claims**

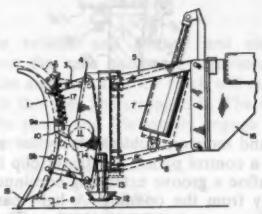


A flexible cleat plate having a plurality of cleats fixed thereto, the plate including a relatively large boss extending around each cleat and a smaller boss extending from the large boss. The cleat plate and cleats are molded into a sole member with a binding agent interposed between the sole and plate.

3,587,182
ADJUSTABLE CONTROL MECHANISM FOR MOVABLY MOUNTED BLADE OF SNOW-PLOUGH

Walter Hirt, St. Blasien (Black Forest), Germany, assignor to Alfred Schmidt Ing., Blasien (Black Forest), Germany

Filed Jan. 29, 1969, Ser. No. 795,106
Claims priority, application Germany, Feb. 29, 1968, P 17 08 664.5
Int. Cl. E01h *5/06*; **E02f** *3/76*
U.S. Cl. 37—41 **3 Claims**

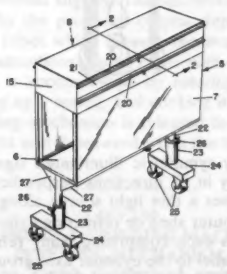


In a snow-plough with a blade which is swingably arranged on a movable supporting member controlled by a lifting device on a carrier vehicle, the supporting member is provided with a vertically adjustable stop skid which prevents the blade from approaching the road surface over a predetermined distance, thus preventing the blade from being blocked when encountering an obstacle.

3,587,183
CLASSROOM BOARDS

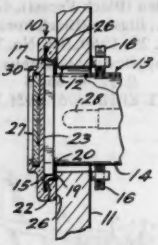
William E. Davis, 5014 Pierce Avenue, College Park, Md. 20740

Filed Feb. 7, 1969, Ser. No. 797,395
Int. Cl. G09f *11/08*
U.S. Cl. 40—83 **6 Claims**



This invention consists of a rectangular cabinet containing a plurality of recesses therein in which are located roller curtains. Each curtain has a different surface such as a chalkboard, cork board, magnetic board, and screen for the reception of projected pictures. The aforesaid cabinet is mounted on the top of two rectangular rigid members against which the aforesaid curtains rest when unrolled for use. Each rigid member is held in equal and parallel spaced relation to each other by a rigid member which is supported at each end by a vertically disposed and adjustable tubular support mounted on wheels that provides mobility for the classroom boards.

3,587,184
PANEL SEAL
Frank A. Walker, Jr., Huntington Beach, Calif., assignor to Master Specialties Company, Costa Mesa, Calif.
Filed June 23, 1969, Ser. No. 835,471
Int. Cl. G09f *13/00*
U.S. Cl. 40—130 **3 Claims**

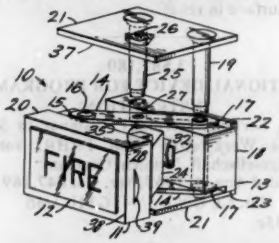


A dust and moisture seal assembly for an indicator light opening in a control panel. A retainer clip is attached to the panel to define a groove extending continuously around and facing away from the opening. A light passing elastomeric seal extends across the panel opening. The seal has an integral lip which is positioned in the groove and sealably engages the panel. A legend plate is attached to the outer surface of the seal by means of a second lip.

3,587,185
OMNIDIRECTIONAL SIGN
Oliver E. Deal, 912 Marguerita Ave., Lancaster, Calif. 90402
Filed Apr. 29, 1968, Ser. No. 724,699
Int. Cl. G09f *13/12*
U.S. Cl. 40—132 **17 Claims**

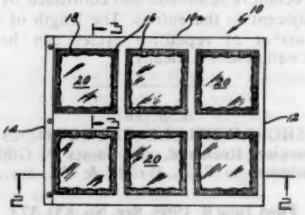
A cylindrically symmetric illuminated sign presenting its legend identically in all directions perpendicular to its axis. The sign comprises a thin light source along the axis and a thin cylindrical outer shell or refracting cylinder made up of annular elements each comprising many refracting surfaces substantially parallel to the cylinder axis, grouped in identical sequences equally spaced around the inner periphery of the annular element. Each sequence of one or more refracting surfaces is separated from adjacent sequences by surfaces radial to the cylinder, and other surfaces which are opaque to prevent unwanted light from passing through the cylinder. The refracting surfaces, cooperating with the smooth outer surface of the cylinder, thus provide prismatic refracting elements which permit passage of light rays from the light source through the cylinder in identical patterns in all radial directions. Insertion of various light filters, moving or stationary, between the light source and the refracting cylinder permits changing colors or legends. Departures from cylindrical symmetry or from identicality of sequences of refracting surfaces on a given annular element permit variations in the legend or displayed image with angular position about the sign's axis. The refracting cylinder may subtend less than 360° or may consist of part of a moving tape of transparent material, bent into cylindrical shape as it passes around the light source, and imprinted with refracting, radial and opaque surfaces. If the diameters of annular elements are varied, the sign may be given spherical, conical, or other axially symmetric shaped.

3,587,186
INDICATOR
Joseph J. Lane, Yorba Linda, Calif., assignor to Master Specialities Company, Costa Mesa, Calif.
Filed June 30, 1969, Ser. No. 837,629
Int. Cl. G09f *13/04*
U.S. Cl. 40—132 **4 Claims**



An indicator unit having a lamp capsule with a legend plate and at least one lamp mounted to illuminate the legend plate. A pair of retaining arms attach the lamp capsule to a terminal board such that the capsule can swing between a normally closed position and an extended position for relamping. Detents lock the terminal board and the lamp capsule to the retaining arms when the capsule is in the closed position. A cam releases the detents when an edge of the legend plate is pushed.

3,587,187
PHOTOGRAPH ALBUM LEAF CONSTRUCTION
William J. Sibley, South Hadley, Mass., assignor to National Blank Book Company, Inc., Holyoke, Mass.
Filed Dec. 13, 1968, Ser. No. 783,672
Int. Cl. G09f *1/10*
U.S. Cl. 40—159 **3 Claims**



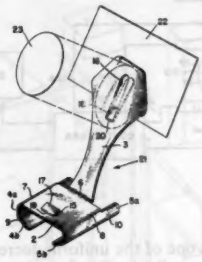
Photograph album leaf and method of making same. Leaf is sheet with heat sealable outer surface folded to form pages back to back, spaced photoprint window pockets being peripherally sealed thereon. Slots underlying pockets provide access for inserting prints through reverse side of sheet between pages. Method includes steps of die cutting slots in flat sheet; overlaying transparent heat sealable sheet (preferably preprinted with decorative borders defining window pocket frames); sealing the pocket margins and simultaneously forming peripheral tear lines; peeling off overlay material around pockets; folding the sheet and forming a binding strip along marginal portions at the free end edges of the sheet.

3,587,188

MESSAGE DISPLAY APPARATUS

Michele Dietrich, Lafayette Hill, and William P. Godley, Maple Glen, Pa., assignor to Honeywell, Inc., Minneapolis, Minn.

Filed Nov. 7, 1968, Ser. No. 774,025
Int. Cl. G09f 3/00
U.S. Cl. 40—336 2 Claims



Apparatus is disclosed for attachment to the base of a standard desk-type telephone set. The apparatus includes a frame member for insertion into the finger cavity provided in the base of such a telephone set. The frame member includes a flap for engaging a downward projecting lip located on the telephone base at the entrance to the cavity, and further includes resilient support means operative to position the flap in locking engagement with the lip. Joined to the frame member is an arm suitable for carrying an advertising message. The arm also has clip means for holding a memorandum.

3,587,189

LIVE BAIT HOLDER

Walter J. Kopicko, 110-B Martin Lane, Wilmington, Del. 19807

Filed Dec. 24, 1968, Ser. No. 786,614
Int. Cl. A01k 83/06
U.S. Cl. 43—44.4 7 Claims

A live bait holder attachable to a fishhook comprises a clamp member having divergent flexible legs of resilient material extending through openings in a support member between which bait is held without being pierced or squeezed unduly. Engagement of the legs with the support member holds the clamp member in open position for loading of bait. Slight pressure on the clamp member causes it to be snap closed. The springlike action of the divergent legs biases the clamp member toward the support member in closed position to retain bait in the holder.

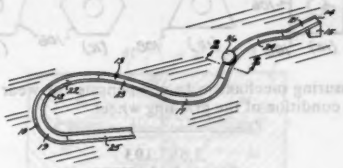
3,587,190

TOY HAVING FLEXIBLE TRACK

Wesley W. Ashton, Santa Ana, Calif., 18121 Fourth Street 92680

Filed Sept. 27, 1968, Ser. No. 763,093
Int. Cl. A63h 33/00
U.S. Cl. 46—43 3 Claims

This invention relates to a toy of the class which incorporates a ball and a track along which the ball is moved. One embodiment is described in the specification and shown in the drawing. The two track rails are separable from an interconnecting section and in the other the track rails and interconnecting section are integrally formed. The ball has a diameter relative to track spacing so that the ball contacts only the rails and not the connecting section as it proceeds along the track. The physical properties of the track material



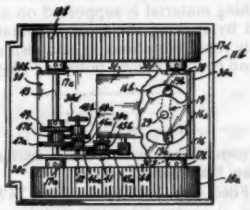
permit it to be twisted and banked and elevated and depressed without the rails becoming separated from the connecting section and such that the track will remain in the position in which the user has arranged it. The track rail is specially made to pinch and frictionally engage an edge of the connecting section of the track.

3,587,191

TOY ROBOT

Julius Cooper, New Hyde Park, N.Y., assignor to Ideal Toy Corporation, Hollis, N.Y.

Filed Feb. 19, 1969, Ser. No. 800,426
Int. Cl. A63h 33/26
U.S. Cl. 46—247 25 Claims



A toy robot having a self-reversing mechanism and a first arm for automatically simulating a karate chop when the second arm is moved slightly. The self-reversing operation is accomplished by the provision of pins depending from the bottom of the robot which reverse the motor circuit when they engage obstructions placed in the path of the robot. The arm operation is accomplished by rotating the right arm, thereby winding up a spring, and cocking it in a raised position. The cocking mechanism is released to allow the spring to force the right arm downward when the left arm is moved slightly.

3,587,192

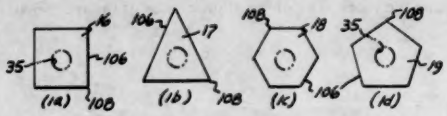
AUTOMATIC PROFILE GRINDING MACHINE WITH AN INDEXING MECHANISM

Oscar Schnellman, Zurich, Switzerland, and Henry Willy Stier, Dearborn Heights, Mich., assignors to Carmet Company, Pittsburgh, Pa.

Filed Aug. 12, 1968, Ser. No. 751,879
Claims priority, application Switzerland, Aug. 16, 1967, 11623/67
Int. Cl. B24b 7/00, 9/00, 47/02
U.S. Cl. 51—121 19 Claims

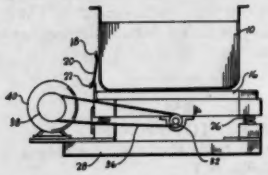
An automatic profile grinding machine with indexing mechanism especially for contour grinding of relatively small parts such as tool inserts, comprised of a grinding wheel, work stations arranged around said grinding wheel, universal work feeding mechanism associated with each work station, individual cam mechanisms for each work station to index the grinding steps, electric and fluid pressure control

mechanisms to control operation of the machine, work measuring mechanism and adjusting mechanism associated with



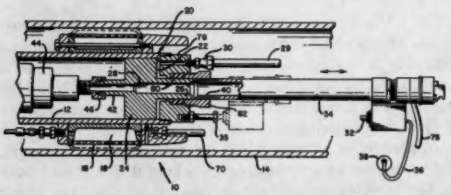
the measuring mechanism to compensate for wear or out of balance condition of the grinding wheel.

3,587,193
ROCK POLISHER
E. R. Lewis, P.O. Box 133, Dayton, Wash. 99328
Filed Dec. 4, 1968, Ser. No. 781,041
Int. Cl. B24b *31/06*
U.S. Cl. 51—163 4 Claims



Apparatus for polishing rocks which I call a Rock Artifact Dinghummer Polisher. A pot contains rocks to be polished as well as polishing material is supported on a table and means are provided by shaking the table automatically with short and extremely rapid vibrations to establish a churning action of material and rocks whereby polishing ensues.

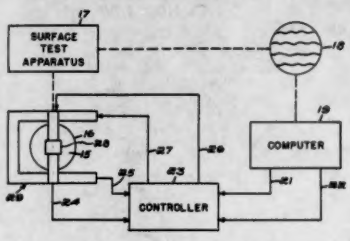
3,587,194
TAP CUTTER
Jerry C. Brown, Sacramento, Calif., assignor to Champion Corporation, Hammond, Indiana
Filed Aug. 2, 1968, Ser. No. 749,671
Int. Cl. B24b *19/00*
U.S. Cl. 51—241 3 Claims



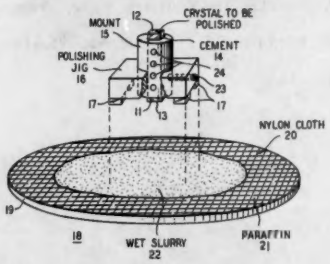
A tap cutter comprising a frame or housing with inflatable sleeves around the housing which are expanded by pneumatic pressure to lock it in place frictionally in a selected position within a sewer, drainage line, or the like, a rotating cutter driven by a pneumatic motor and a piston for moving the cutter axially of the pipe through a predetermined stroke. The expansible locking means, the pneumatic motor and the piston are connected by ducts from a source of pressure fluid. A signal device may be provided to indicate when the stroke of the piston is completed.

3,587,195
OPTICAL SURFACE GENERATING METHOD
Ronald Aspden, Bedford, Mass., assignor to Itek Corporation, Lexington, Mass.
Filed Apr. 8, 1968, Ser. No. 719,657
Int. Cl. B24b *1/00*
U.S. Cl. 51—284 17 Claims

A method wherein an optical blank work surface is figuratively divided into an array of adjoining surface areas and measured to determine the total relative number of uniformly sized blank material decrements that are required in each surface area to produce a desired surface contour. An optical lap moving across the work surface in an irregular continuous path produces one of the uniform decrements upon each traversal across an individual surface area. The lap is controlled such that its travel path exhibits a preference for movement from an occupied area to adjacent areas still requiring the greatest number of material decrements.



3,587,196
METHOD OF POLISHING SOFT, WATER-SOLUBLE CRYSTALS
Frank A. Dunn, Fair Haven, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.
Filed May 9, 1969, Ser. No. 823,257
Int. Cl. B24b *1/00*
U.S. Cl. 51—326 10 Claims

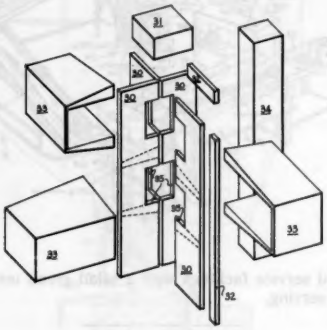


A polishing technique for soft, water-soluble crystals is disclosed. The edges of the crystal are beveled to prevent crumbling; and the crystal is lapped, in an anhydrous wet lapping step and then in at least one dry lapping step. Both steps employ a nonfrayable cloth, such as nylon, embedded in a soft wax or paraffin on a flat surface and impregnated in the center region only with an abrasive of diameter less than 0.3 μ meters. The abrasive is supplied in a slurry including benzene which fluidizes the wax in the center region only. Typically, the crystals to be polished have at least one oxygen atom in each unit cell and have a hardness less than 3 Mohs.

3,587,197
PREFABRICATED CANTILEVERED BUILDING STRUCTURE
Marvin W. Renfro, 24621 Del Prado, Dana Point, Calif. 92629
Filed July 1, 1968, Ser. No. 741,772
Int. Cl. E04b *1/34, 1/348*
U.S. Cl. 52—73 31 Claims

A low-cost modular building designed to be mass produced at a remote location, transported to the building site, and erected in a short period of time. The building is comprised of five basic modular parts which are: (1) support parts-

—designed to carry the loads of the building; (2) a mechanical service unit—housing all necessary equipment for the building; (3) service line enclosures—containing all of the utility services; (4) enclosing units—providing the basic room or housing facility of the building; and (5) a vertical unit-



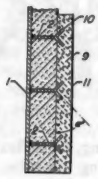
—providing vertical access between the various units and between the various units and the ground level.

3,587,198

HEAT PROTECTED METAL WALL

Walter C. Hensel, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Illinois

Filed Apr. 14, 1969, Ser. No. 815,840
Int. Cl. B04g *21/04*; B04b *1/16*
U.S. Cl. 52—741 **2 Claims**



The method and means for providing a two-layer heat-protected metal wall for use in high temperature chambers in which metal holding members having bendable end portions are welded to the metal wall, a lightweight castable insulating material is applied adjacent to the metal wall, the holding members are bent to extend beyond such material, and a castable monolithic refractory material is applied adjacent to the lightweight material, to completely embed the holding members. The two layers are thus anchored and supported to the metal wall by means of the holding members.

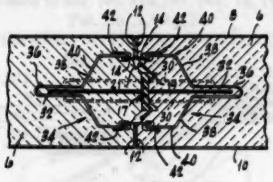
3,587,199

LOCKING MECHANISM FOR SECTIONAL COOLERS

James Henry, Levittown, Pa., and Winfield R. Burtis, Trenton, N.J., assignors to Emhart Corporation, Bloomfield, Conn.

Filed Mar. 27, 1969, Ser. No. 811,102
Int. Cl. E04c *1/10*
U.S. Cl. 52—582 **7 Claims**

Refrigerated equipment embodying a plurality of panels secured together in edge to edge relation with each panel being formed of a body of thermal insulating material having metal sheets secured to the opposite faces of the insulating material wherein the sheets have edge portions thereof turned inwardly adjacent the edges of the panels and presenting reversely turned flanges extending parallel to the metal



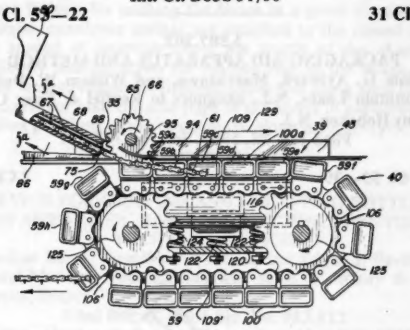
sheets. Brackets are supported by such flanges and having panel-securing means mounted on the brackets.

3,587,200

CONTINUOUS SKIN-PACKAGING MACHINE AND METHOD

Roger W. Stone, Highland Park, and Donald R. Rorer, Lake Bluff, Ill., assignors to Stone Container Corporation, Chicago, Ill.

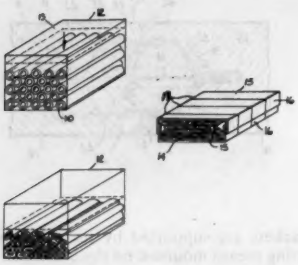
Filed May 21, 1969, Ser. No. 826,604
Int. Cl. B65b *31/00*
U.S. Cl. 53—22 **31 Claims**



A continuous skin-packaging machine having a linearly movable conveyor for transporting a continuous web or series of discrete base pads or substrates with articles thereon to a vacuum-forming station. A vacuum-forming station is arranged in line with said conveyor including an angularly displaceable array of platens for receiving the web or a base pad with articles transferred from the conveyor and moving in the same direction of movement as the conveyor and applying a vacuum draw to the underside of the web or base pad concurrently. A heater assembly and a thermoplastic film-transporting mechanism associated therewith are spaced above the conveyor for delivering heated film to the vicinity of transfer of the web or a base pad to the vacuum-forming station so that the film can be laminated to the web or base pad encasing said articles thereon as the web or base pad is moved by the platens. Said skin-packaging operation is performed continuously with continuous feeding of web or base pad with articles and heated film to said vacuum-forming station. The machine also can have a package-trimming station for receiving the completed packages discharged from the vacuum-forming station.

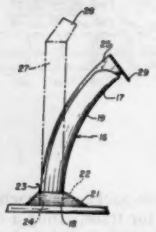
Also, there is evolved a novel method of making skin packages continuously in accordance with the steps performed sequentially by the continuous skin-packaging machine aforesaid.

3,587,201
PIPE-INSULATION PACKAGING SYSTEM
John Joseph Strayer, Defiance, Ohio, assignor to Johns-Manville Corporation, New York, N.Y.
Filed July 10, 1968, Ser. No. 743,720
Int. Cl. B65b *13/20*, *11/58*; B31b *1/72*
U.S. Cl. 53—24 7 Claims



Packaging bulky and resilient low density mineral fiber products of generally tubular construction with reduced volume.

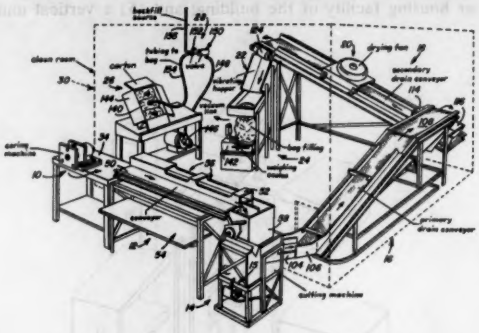
3,587,202
PACKAGING AID APPARATUS AND METHOD
William G. Aylward, Morristown, and William W. DuPont, Mountain Lakes, N.J., assignors to Reuffel & Esser Company Hoboken, N.J.
Filed July 25, 1968, Ser. No. 747,531
Int. Cl. B65b *7/08*
U.S. Cl. 53—39 2 Claims



Means for removing excess air from the interior of a plastic bag package containing a packet of sensitized paper is provided and comprises bending the bagged packet over an arcuate surface to achieve a displacement from the normal, substantially planar attitude of the package through an angle of about 20° and sealing the plastic bag prior to release of the packet from such displaced position.

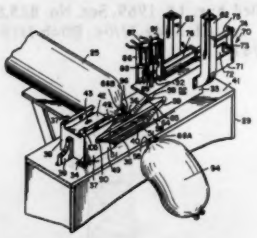
3,587,203
APPARATUS FOR PREPARING SALAD MIXES
Francis E. Miles, P.O. Box 682, Incline Village, Nev. 89450
Filed Oct. 22, 1968, Ser. No. 769,618
Int. Cl. B65b *31/00*; A23l *1/00*
U.S. Cl. 53—112 5 Claims

A means for the preparation of a tossed salad mix from salad greens wherein the salad greens are severed into segments, washed, drained, and inert atmosphere packaged in a manner whereby oxidative discoloration of the segments is eliminated, i.e., retarded for a sufficient period of time, to render it economically feasible to provide restaurants and



other food service facilities with a salad green mix which is ready for serving.

3,587,204
CLINCHING APPARATUS
William W. George, P.O. Box 303, North 16th Street, New Castle, Ind. 47362
Filed Nov. 4, 1968, Ser. No. 773,030
Int. Cl. B65b *51/04*; B65d *77/12*
U.S. Cl. 53—138 10 Claims



A machine for forming, from flexible sheet material, a continuous tube while filling the tube, advancing the filled tube past a closing station, and there transversely ensmalling the tube to define a neck region of significant length in the direction of tube movement, feeding two clinching staples formed of ductile material into straddling relation with said neck region at longitudinally spaced points thereof, bending said staples into clinching relation to said neck region to define, when the tube is formed of materials such as polyethylene film, moistureproof, substantially airtight tube closures, and severing the neck region between said closures. In one form of the invention, force is separately applied to both legs of each staple to move said legs past each other in the clinching operation; in another form, pressure is applied by a reciprocating plunger to one leg only of each staple while the other leg is held stationary; and in a third form, an oscillatory member is engaged in an eye at the distal end of one leg of each staple to drag that staple end past the stationarily held end of the other staple leg. With or without slight structural modification, the machine may be used in a slightly different manner to close and clinch the mouth of conventional bags.

A novel staple for optimum use in the machine is also disclosed.

Additionally a novel handtool for declinching such staples to open the packages delivered by the machine is included in the disclosure, such tool being usable, if desired, to apply, or to reapply, such staples for initially forming, or for subsequently reclosing, such packages.

3,587,205

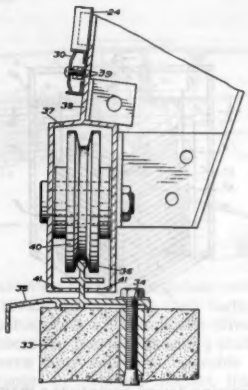
BUILDINGS

Joseph Henry Gartside, Blackley, Manchester, England

Continuation-in-part of application Ser. No. 742,280, July 3, 1968, now abandoned. This application Oct. 29, 1968, Ser. No. 777,970

Int. Cl. ED46 *1/32, 1/343*

U.S. Cl. 52—64 3 Claims



Building includes arch members each having a T-shaped cross-section. Leg of T projects inwardly, and two flanges between arms of T project outwardly. Covering material rests on outer faces of arms of T, and capping means retain covering material in place, fasteners for capping means extending into space between the flanges. Strengthening means may be secured to each arch member in spaced relation thereto. Each arch member may be formed in two halves joined at the apex. Lower ends of arch members secured to a T-shaped base member, if building is fixed, or to channel-shaped base member containing rollers, if building is movably mounted, rollers engaging fixed rail.

3,587,206

VACUUM HEAD FOR STACKING OBJECTS

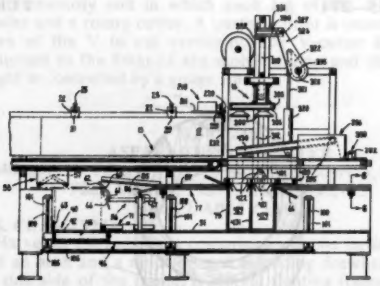
James J. Shuttleworth, 1300 Salamonie Ave., Huntington, Ind.

Division of Ser. No. 514,205, Dec. 16, 1965, Pat. No. 3,386,284

Filed May 31, 1968, Ser. No. 739,920

Int. Cl. B65b *39/00*

U.S. Cl. 53—247 1 Claim



A case packer for lifting objects and placing the objects in a container. A vacuum head having vacuum cups is slidably mounted in a vertical track over a horizontally movable platform which receives the objects from a first conveyor. A second conveyor positions the container under the movable platform. A funnel for guiding the objects from the cups to the container moves partially in the container after the platform slides away. The vacuum cups lift the objects from the platform and places the objects in the container.

3,587,207

FLAP BREAKER AND HOLDER

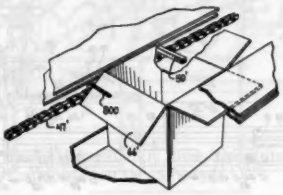
James J. Shuttleworth, 1300 Salamonie Ave., Huntington, Ind.

Division of Ser. No. 514,205, Dec. 16, 1965, Pat. No. 3,386,224.

Filed May 31, 1968, Ser. No. 739,953

Int. Cl. B65b *43/39*

U.S. Cl. 53—381 2 Claims



An apparatus to break and hold flaps of boxes to be packed with objects in a case packer. A conveyor mounted on the case packer carries boxes to a loading position. A closed chain mounted to the case packer has rigid bars spaced along its length projecting over the conveyor in cantilever fashion for pushing the boxes in a given direction. In addition, cantilever springs are attached to the closed chain and spaced at intervals along the length of the chain for resiliently holding down the leading flap of the boxes. Mutually facing recesses positioned above and along each side of the conveyor hold the side flaps of the boxes in outwardly extending positions as the boxes move along the conveyor.

3,587,208

DEVICE FOR GRIPPING AND UNCAPPING BOTTLES AND AUTOMATIC HANDLING MACHINES PROVIDED WITH SUCH DEVICES

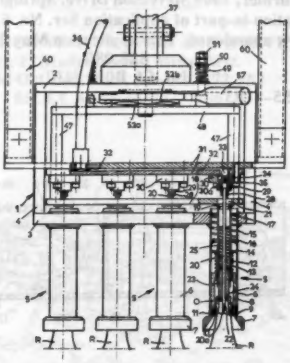
Jean-Luc Berry, Mesnil-sur-L'Estree, and Edgar J. Dardaine, Sorel-Moussel, France, assignors to E. P. Remy & Cie, Dreux, France

Filed Dec. 8, 1969, Ser. No. 883,112

Claims priority, application France, Dec. 12, 1968, 177789

Int. Cl. B67b *7/08, 7/12*

U.S. Cl. 53—381A 13 Claims



Device for automatically gripping and uncapping bottles, comprising gripping members each provided with pressing means to seize the upper end of the neck of a bottle and with a needle movable in translation with respect to the said

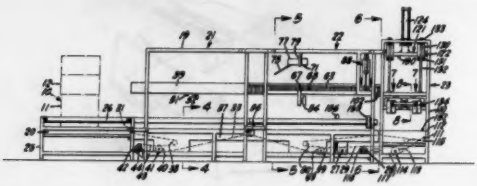
gripping member so as to penetrate into the bottle neck by passing through the cap and to draw off the said cap when moving out from the said bottle neck.

3,587,209

CASE GLUER AND SEALER

John C. Arentz, West Reading, Pa., assignor to North American Rockwell Corporation, Pittsburgh, Pa.

Filed Sept. 29, 1969, Ser. No. 861,698
Int. Cl. B65b 7/20
U.S. Cl. 53—374 13 Claims



A machine for sealing cases having upper and lower telescoped sections with bottom and top closure flaps respectively. The loaded cases partially telescoped to expose normally overlapped portions of the lower section are fed to the machine with the flaps of the lower section closed and the side flaps of the upper section open. As the case enters the machine it is so supported that a first bottom side flap swings downwardly and means are provided to apply adhesive to portions of the thereby exposed bottom end flaps. As movement of the case continues said first side flap is closed and the other bottom side flap swings downwardly and adhesive is applied to thereby exposed portions of the end flaps. Adhesive is also applied to the exposed but normally overlapped sidewall portions of the lower section and adhesive is applied to the inner surfaces of the side flaps of the upper section. The other side flap of the bottom section and both side flaps of the upper section are then closed and the case is subjected to vertical compression to complete the telescoping of the sections and is then subjected to lateral compression the compressive forces being maintained until the adhesive takes an initial set.

3,587,210

AIR POLLUTION REDUCTION SYSTEM

Walter Shriner, 1409 Stevenson Drive, Springfield, Ill. 62703

Continuation-in-part of application Ser. No. 658,874, Aug. 7, 1967, now abandoned. This application May 2, 1969, Ser. No. 828,080
Int. Cl. B03c 3/30
U.S. Cl. 55—103 13 Claims

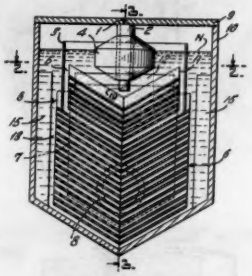
An air pollution reduction system embodying dielectric means to induce electrostatic forces in the path of a polluted fluid stream to cause precipitation of solids in said stream in combination with particulate collecting material means to remove such solids from the fluid stream.

3,587,211

DEVICE FOR DEGASSING LIQUIDS

Paul Gagliardi, 19, rue Auguste Blanqui, 93 Aulnay, Sous Bois, France

Filed July 18, 1969, Ser. No. 842,966
Claims priority, application France, July 19, 1968, 159,957
Int. Cl. B01d 19/00
U.S. Cl. 55—199 9 Claims



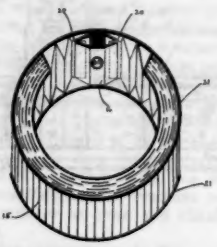
A liquid-degassing device comprises a main separator composed of a plurality of spaced and parallel dihedral sheets each having a pair of side portions rising in opposite directions from its apex line, to provide a plurality of superposed laminar liquid passages in the direction of the aligned apex lines of the sheets of shallow angular cross section. The member is mounted within a closed housing between a pair of liquid input and output equalizing chambers for dividing and passing a liquid stream to be degassed into multiple laminar partial streams traversing said passages, with the liquid rising and emerging laterally from said passages to a predetermined level above said member enclosing a gas collecting chamber with the adjoining housing walls. As a result, liquid bubbles rise laterally along the laminar passages and upwardly into said collecting chamber. Special liquid deflecting means act to bypass spurious lateral liquid currents in an upward direction upon emerging from the open lateral ends of the laminar passages for subsequent passage through an auxiliary separator disposed above the main separator.

3,587,212

CARBURETOR AIR INTAKE FILTERS

Raymond M. Nowicki, 30 Linn Road, Nutley, N.J.

Filed July 1, 1970, Ser. No. 51,606
Int. Cl. B01d 35/14
U.S. Cl. 55—274 1 Claim



An annular pleated filter with a vibrating-reed warning device clamping ends of the filter paper and being bonded to end gaskets.

3,587,213

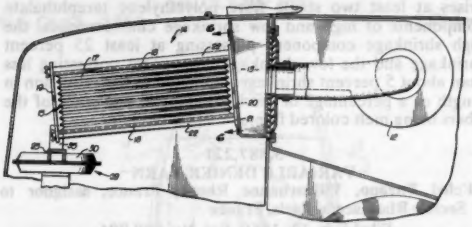
STREET SWEEPER FILTER CLEANING SYSTEM

Simon Tamny, Los Angeles, and James B. Tyler, Chino, Calif., assignors to Wayne Manufacturing Company, Pomona, Calif.

Continuation of application Ser. No. 790,491, Sept. 10, 1968, now abandoned. This application Mar. 26, 1970, Ser. No. 20,487

Int. Cl. B01d *46/04*

U.S. Cl. 55—300 5 Claims



A shaker mechanism for vibrating street sweeper air filters to remove dirt accumulations from their surfaces, the invention providing particularly a hydraulically driven enclosed eccentric force generating mechanism and a shaker component receivable between filter cells and operable within limited displacement range to produce impact limited resonant vibration of the cells.

3,587,214

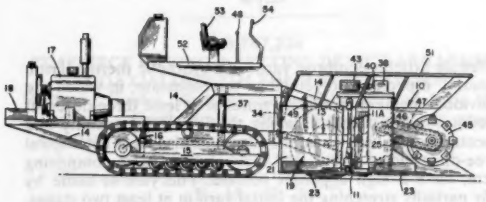
SUGAR CANE HARVESTER

Harold A. Willett, and Jacob A. Giardina, Thibodaux, La., assignors to Cane Machinery & Engineering Co., Inc., Thibodaux, La.

Filed Aug. 3, 1970, Ser. No. 60,535

Int. Cl. A01d *45/10*

U.S. Cl. 56—17 7 Claims



The present disclosure is directed to a sugar cane harvester of the V-cutter type which may cut at least two rows of cane simultaneously and in which each leg of the V has static blades and a rotary cutter. A parting cutter is mounted at the apex of the V to cut vertically. The V-cutter is pivotally mounted to the front of the mobile frame and the working depth is controlled by a guage wheel.

3,587,215

ASPARAGUS HARVESTER

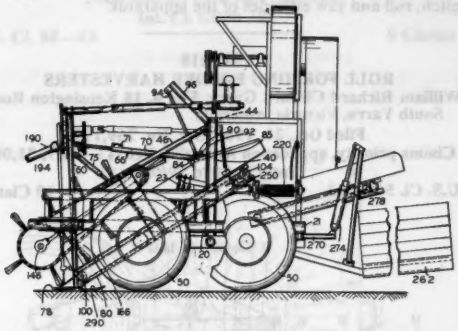
Wellington W. Porter, RD#2 Dublin Rd., Waterloo, N.Y.

Filed Aug. 11, 1969, Ser. No. 848,773

Int. Cl. A01d *45/00*

U.S. Cl. 56—327A 8 Claims

Harvester for asparagus comprising a frame having wheels, and an arch and a rigid forward extending drawbar disposed on one side of the frame, a second floating frame disposed forwardly of the arch, with respect and springs to counter balance the weight of the forward frame, a transverse cutter bar assembly extending transversely across the lower end of the second frame and adapted to cut at ground level, a wide conveyor having a rigid frame and including inclined side members affixed rigidly to the cutter assembly support and second frame, springs resiliently suspending the upper end of the inclined side members of the conveyor from the arch, and a link swivelly connecting the arch and upper end of the conveyor to support the upper end thereof with freedom of movement by reason of its affixation to the second frame,



and fan blades immediately over the cutter assembly for blowing asparagus upon the conveyor.

3,587,216

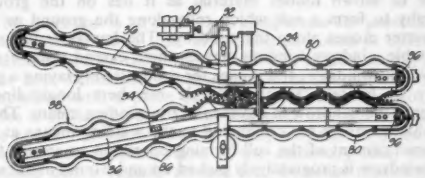
CELERY HARVESTER

Tobias Grether, Camarillo, and Roger M. Donlon, Oxnard, Calif., assignors to Hi-Gear Harvester Company, Oxnard, Calif.

Filed Aug. 26, 1968, Ser. No. 755,099

Int. Cl. A01d *45/00*

U.S. Cl. 56—327 2 Claims



A celery or other row crop harvester on a vehicle including a pickup conveyor and a crop cutter wherein the conveyor comprises a pair of endless conveyor elements having facing runs, the conveyor elements including flexible belts each of which comprises a series of bulges away from a conveyor chain, the bulges of one belt being disposed longitudinally between the bulges of the other belt; and conveyor chains on supporting beams, the beams carrying guides for the chains and the beams and guides being provided with wear strip means to hold the chains out of contact with the beams and portions of the guides.

3,587,217

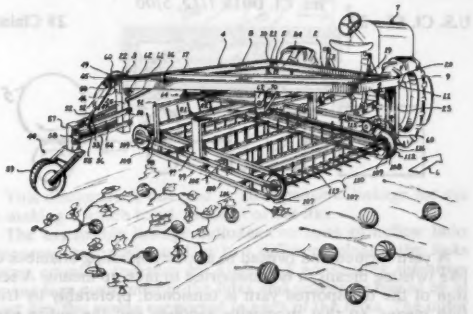
COMBINATION VINE TRAINER AND HARVESTER

Billie L. Harriott, 22 Madrid Plaza, Mesa, Ariz.

Filed Oct. 30, 1969, Ser. No. 872,552

Int. Cl. A01d *45/00*, *77/06*

U.S. Cl. 56—327 3 Claims



An improved apparatus for training vines and selectively

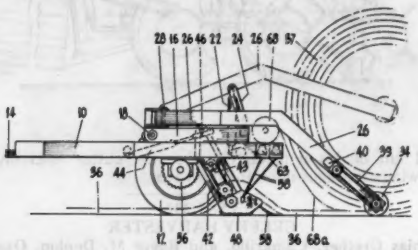
harvesting melons which, in addition to previously known means for employing flexible fingers for training vines, adds an improved suspension system featuring means for adjusting pitch, roll and yaw attitudes of the apparatus.

3,587,218

ROLL FORMING FODDER HARVESTERS

William Richard Clifford Geary, Flat 4, 18 Kensington Road, South Yarra, Victoria, Australia

Filed Oct. 21, 1968, Ser. No. 769,192
Claims priority, application Australia, Dec. 11, 1967, 31,006
Int. Cl. A01d *39/00*
U.S. Cl. 56—343 10 Claims



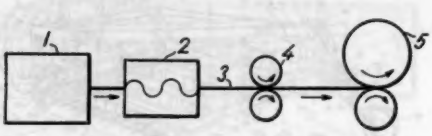
A roll-forming fodder harvester adapted to roll up a windrow of mown fodder material as it lies on the ground thereby to form a roll which rolls along the ground as the harvester moves along the windrow. The harvester includes rotatable windrow winding means which extend transversely above the windrow, and means for progressively laying a plurality of laterally spaced flexible members longitudinally beneath the windrow in advance of the winding means. These flexible members are connected to the winding means at the commencement of the roll-forming operation to ensure that the windrow is progressively picked up and wound about said winding means as the harvester moves forwardly. The said rotatable winding means are preferably mounted on the free rear ends of a laterally spaced pair of longitudinally extending arms which have their forward ends pivotally connected to a supporting frame so as to enable these arms to swing upwardly and downwardly in unison and also to swing inwardly towards and outwardly from each other. Thus, when the formation of a fodder roll is completed, the arms may be moved outwardly to withdraw the winding means therefrom.

3,587,219

CONTINUOUS BREAK SPINNING METHOD AND APPARATUS

Josef Ripka; Jan Junek; Milan Marsalek, and Frantisek Hortlik, Usti Nad Orlici, Czechoslovakia, assignors to Vyzkumny Ustav Bavlnarsky Usti Ordici, Czechoslovakia

Filed Feb. 27, 1969, Ser. No. 802,799
Claims priority, application Czechoslovakia, Feb. 28, 1968, 1548-68
Int. Cl. D01h *1/12, 5/00*
U.S. Cl. 57—34 29 Claims



A yarn formed and twisted in a rotary spinning chamber or like twisting means, it is transported to take up means. A section of the transported yarn is tensioned, preferably by friction means, so that successive sections and the entire yarn are permanently stretched and deformed whereby the tensile strength of the yarn is increased.

3,587,220

DIFFERENTIAL SHRINKAGE YARN AND FABRIC MADE THEREFROM

Philip William Eggleston, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Sept. 4, 1968, Ser. No. 757,479
Claims priority, application Great Britain, Sept. 13, 1967, July 12, 1968, 41795/67;33366/68
Int. Cl. D02g *1/18, 3/04, 3/24*
U.S. Cl. 57—140 7 Claims

A fabric composed of yarn including a yarn which comprises at least two staple fibre polyethylene terephthalate components of high and low shrinkage characteristics, the high shrinkage component possessing at least 25 percent shrinkage and the low shrinkage component possessing less than about 5 percent shrinkage expressed as the reduction in length as a percentage of the initial length, and some of the fibers being melt colored fibers.

3,587,221

VARIABLE DENIER YARN

Michel Buzano, Villeurbanne Rhone, France, assignor to Societe Rhodiaceta, Paris, France

Filed Feb. 17, 1969, Ser. No. 799,796
Claims priority, application France, Feb. 19, 1968, 140,388
Int. Cl. D02g *1/00, 3/00*
U.S. Cl. 57—140 7 Claims

Textile articles comprise yarns of a synthetic thermoplastic material, especially polyethylene terephthalate, in which the individual filaments comprise zones of at least three different thicknesses, the thickest having the lowest crystallinity and orientation and vice versa; the filaments also have a nonspiral three-dimensional crimp, and they, and the yarns comprising them, have a high apparent volume. The yarn is made by only partially stretching the initial yarn in at least two stages, during at least one of which the yarn is in contact with a crack or fillure promoting agent, and subsequently giving the yarn, before or after it is made up, a heat treatment while it is in a relaxed state.

3,587,222

LINEAR CLOCK

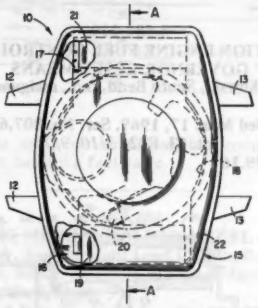
Robert Mestrovic, 2630 North Burling Ave., Chicago, Ill. 60614

Filed June 20, 1969, Ser. No. 835,067
Int. Cl. G04b *45/00*
U.S. Cl. 58—2 6 Claims

A clock face employs a linear scale alongside an elongated slot. The face is positioned over one or a pair of helixes so

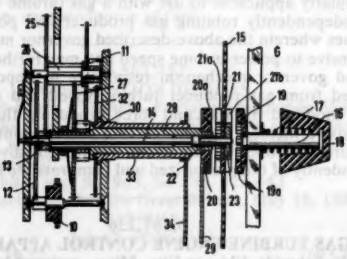
that only a short, straight-line segment is visible therethrough. As the helix or pair of helixes is rotated by the clock movement, the visible segments travel longitudinally of the slot and indicate the time.

3,587,223
ELECTRONIC WRIST WATCH
Norman Charles Zatsky, Briarcliff Manor, N.Y., assignor to Timex Corporation, Waterbury, Conn.
Filed Apr. 6, 1970, Ser. No. 028,159
Int. Cl. G04c *3/00*
U.S. Cl. 58—23BA **5 Claims**



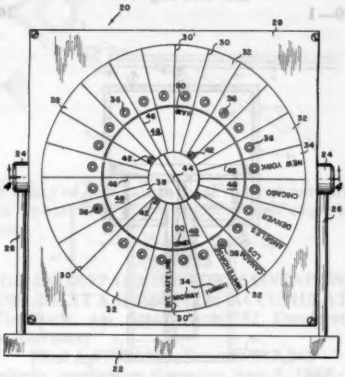
An electronic wrist watch includes a watch case having three compartments. One side compartment contains a quartz crystal, the central compartment contains a balance wheel movement including a dial train drive and time indicating hands, and the other side compartment contains electronic circuitry. A clear glass or plastic crystal is positioned over the central compartment.

3,587,224
TIMEPIECE HAVING A SETTING DEVICE ARRANGED COAXIALLY WITH THE HANDS ARBORS
Wolfgang Ganter, Heitgenbronnerstrabe 52, and Kurt Von Zeppelin, Geothestrabe 30, Schramberg/Wurttemberg, Germany
Filed Mar. 7, 1968, Ser. No. 711,268
Claims priority, application Germany, Mar. 22, 1967, P 15 48 147.7
Int. Cl. G04c *9/00*
U.S. Cl. 58—34 **19 Claims**



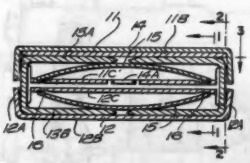
Timepiece with a manually operated setting knob rotatably mounted on the dial cover glass coaxial with the rotating hands arbors such that the seconds hand or both seconds and minutes hands can be set by pressing inwardly and rotating the setting knob.

3,587,225
EARTH TIME COMPARATOR
Irving Keiser, 1630 Makiki Street, Honolulu, Hawaii
Filed Jan. 23, 1970, Ser. No. 5,188
Int. Cl. G04b *19/22*
U.S. Cl. 58—43 **9 Claims**



This invention is an earth time comparator for providing a comparison of clock time in relation to points in different selected reference time zones, both with respect to day and night hour times and designation of the particular day in comparison with a place of reference. The comparator includes a stationary disc radially divided into the 24 global time zones. A rotatable disc is axially mounted in a central, complemental recess formed in the stationary disc, which rotatable disc is radially divided into 24 zones representing the 24 hours in a day. Movement of the rotatable disc actuates day-indicating assemblies to indicate the day with respect to the place of reference, i.e. "yesterday", "today" or "tomorrow".

3,587,226
EXPANSIBLE LINKAGE FOR USE IN MAKING A WATCH BAND OR SIMILAR ARTICLE OF JEWELRY
Kurt A. Rieth, Warwick, R.I., assignor to Textron Inc., Providence, R.I.
Filed Aug. 6, 1968, Ser. No. 750,560
Int. Cl. F16g *13/24*
U.S. Cl. 59—79 **8 Claims**

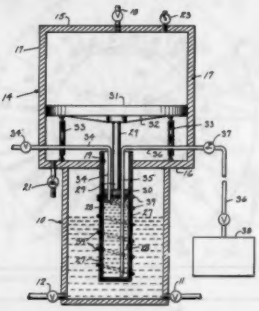


This disclosure is directed to an expansible linkage for use in making a watch band, bracelet or the like.

The expansible linkage includes two rows of hollow links staggered and positioned in two different planes, the links being coupled together by U-shaped connecting members having legs positioned in the links and resiliently biased by at least one flat spring supported in each of the links. The outer portions of the spring engage the inner wall of the link and

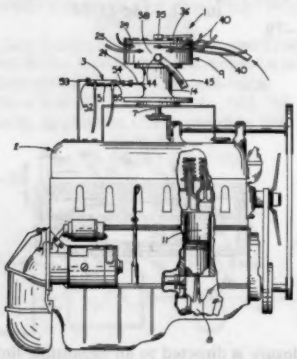
the central portion of the spring is shaped to resiliently urge the legs of the connecting members towards the outer wall of the link and away from a link of the other row of links.

3,587,227
POWER GENERATING MEANS
Maxwell H. Weingarten, and Robert J. Weingarten, both of 4720 North Cramer St., Milwaukee, Wis.
Filed June 3, 1969, Ser. No. 830,082
Int. Cl. F03g 7/06
U.S. Cl. 60—1 26 Claims



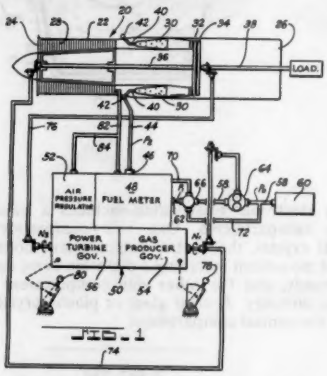
Utilizing the natural forces of osmosis inherent in nature a power generator is provided including a porous container having a surrounding internal and/or external semipermeable membrane and containing a solution of relatively high molecular concentration selective to said membrane, which container is mounted in a chamber into which a solvent is introduced, said solvent flowing by osmosis through said semipermeable membrane into said solution container, the resulting increased liquid volume in said container forcibly extending an associated piston to pressurably engage and compress the air or other fluid in an adjacent pressure cell to create pressure therein providing a source of potential power for any desired purposes.

3,587,228
AIR STARTER VALVE CONTROL SYSTEM FOR A MULTICYLINDER ENGINE
Edward H. Clements, Malvern, Ark., assignor to Exline, Inc., Salina, Kans.
Filed Oct. 16, 1969, Ser. No. 866,901
Int. Cl. F02n 9/04; F01b 27/00, 29/04
U.S. Cl. 60—16 12 Claims



An air starter valve control system for adjusting the timing of the introduction of starting air into cylinders of an engine to be started in coordination with the speed thereof wherein a power member is responsive to signals from a speed sensing device for adjusting the relative position of air valves and a cam rotated in response to rotation of the engine crankshaft. The air valves are arranged to control airflow passages that communicate a supply of starting air to the respective cylinders of the engine to be started when the cam holds the respective air valve in an open position. The power member is operative to change the relative position of the air valves and cam between a starting position having sufficient retard to allow initial rotation and a running position having sufficient advance to develop a proper starting speed and to return the air valves and cam to the starting position all in response to respective signals from the speed sensing device. The starting air closes all the air valves except the air valve held open by the cam and the air valves each have resilient members for positioning same to clear the cam when the supply of starting air is discontinued.

3,587,229
COMBUSTION ENGINE FUEL CONTROL HAVING GOVERNOR RESET MEANS
Joseph L. Peczkowski, South Bend, Ind., assignor to the Bendix Corporation
Filed Mar. 17, 1969, Ser. No. 807,697
Int. Cl. F02c 3/10, 9/08
U.S. Cl. 60—39.16 11 Claims

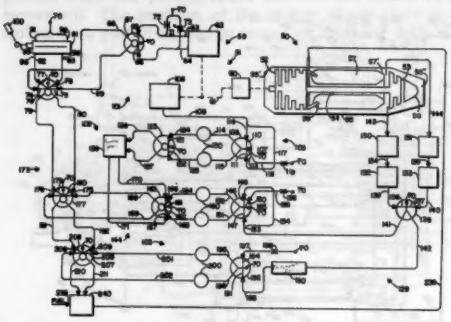


Engine governor mechanism adapted to produce a fuel controlling governor error output signal derived from opposing input reference and engine speed generated forces and provided with a force producing fluid pressure responsive member connected in force opposing relationship to the input reference force and responsive to a pressurized and compressible fluid signal derived from a source including an accumulator which signal is controlled by valve means responsive to the governor error output signal to thereby provide a governor feedback control circuit having lag-lead compensation. The above-described governor mechanism is particularly applicable to use with a gas turbine engine having independently rotating gas producer and power output turbines wherein the above-described governor mechanism is responsive to power turbine speed and may further include a second governor mechanism responsive to opposing forces derived from gas producer turbine speed and a reference force modified by a second force producing fluid pressure responsive member responsive to a second controlled fluid pressure controlled by the above-mentioned valve means independently of the pressurized and compressible fluid signal.

3,587,230
GAS TURBINE ENGINE CONTROL APPARATUS
Ross D. Schmidt, Chisago City, Minn., assignor to Honeywell, Inc., Minneapolis, Minn.
Filed July 13, 1967, Ser. No. 653,101
Int. Cl. F02c 9/04
U.S. Cl. 60—39.28 8 Claims

A closed loop fluidic stall prevention circuit for a turbojet engine control system comprising a temperature sensor, a speed sensor and a function generator. The function generator converts an engine speed signal from the speed sensor

into a reference temperature signal. The reference temperature signal is combined with a turbine inlet temperature



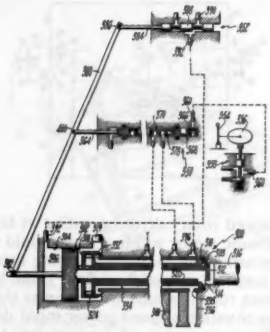
signal from the temperature sensor to provide an output which is used to control a fuel valve.

3,587,231

SEQUENCING MECHANISM FOR A FUEL CONTROL

George A. Fisher, Saugus, Calif., and Charles F. Stearns, East Longmeadow, Mass., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed June 26, 1969, Ser. No. 836,774
Int. Cl. F02g *1/06*
U.S. Cl. 60—39.28 **5 Claims**



By a sequencing control, fuel is sequentially fed to a plurality of nozzles disposed at different stations in an engine. The sequential control interconnects the nozzles with metered fuel from a main fuel control in a predetermined manner in response to power lever position once the nozzles are filled from another source of fuel.

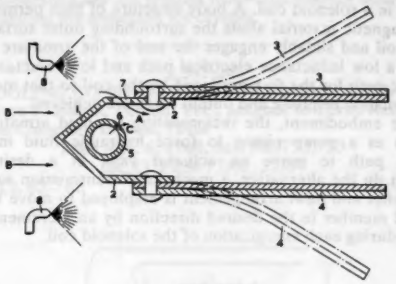
3,587,232

COMBUSTION DEVICES

William Dean Bryce, Farnham, England, assignor to Minister of Technology in Her Britannic Majesty's government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed May 9, 1969, Ser. No. 823,442
Claims priority, application Great Britain, May 16, 1968, 23298/68
Int. Cl. F02k *3/10*
U.S. Cl. 60—39.72 **10 Claims**

A flame stabilizer comprises an angle section fixed with its apex pointing upstream. At each of its downstream extremities is a bimetallic plate, the two plates extending downstream in the direction of flow and parallel to each other. A pilot burner in the form of a fuel spray bar extends transversely of the stabilizer within the angle section in which there are small holes to admit air to the burner. The inner faces of the bimetallic plates are of nickel alloy having a high coefficient of expansion and the outer faces are of a refractory metal such as niobium or molybdenum having a low coefficient of expansion. The differential expansion of the plates



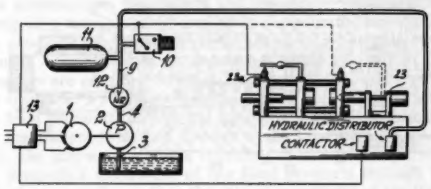
under the effect of heat causes these to bend outwardly to increase the frontal area of the stabilizer and cause increased turbulence.

3,587,233

METHOD AND APPARATUS FOR MAINTAINING THE PRESSURE AT A HYDRAULIC ACCUMULATOR

Alfred Fischbach, am Scheffert 1/5252 Runderoth/Bezirk Cologne, Germany

Filed Apr. 3, 1969, Ser. No. 813,245
Claims priority, application Germany, Apr. 5, 1968, Jan. 28, 1969, P 17 78 198.1 and P 19 04 037.0
Int. Cl. F15b *1/02*
U.S. Cl. 60—51 **10 Claims**



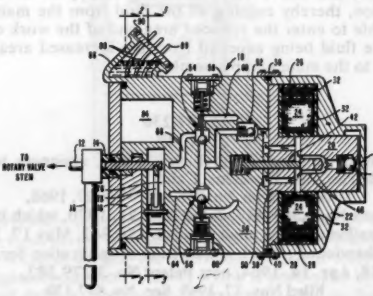
A source of pressure fluid is connected with a hydraulic accumulator to maintain the pressure required for pressure consuming operations of a hydraulically driven machine part. The flow of fluid from the source, such as a pump, to the accumulator is controlled depending on the operations of the machine part.

3,587,234

ELECTROHYDRAULIC MECHANICAL ACTUATOR

Malcolm M. McQueen, 19430 Marilla Street, Northridge, Calif. 91325

Filed Aug. 5, 1968, Ser. No. 750,039
Int. Cl. F01c *9/00*; **F04b** *17/04*
U.S. Cl. 60—52 **13 Claims**



An actuator system is disclosed employing a reciprocating solenoid coupled through an appropriate transmission system

for moving an actuated member in incremental steps between alternative actuated positions with high torques at low speeds. The solenoid has an armature slidably engaged at one end for reciprocating movement through the central opening in a solenoid coil. A body structure of high permeability magnetic material abuts the surrounding outer surface of the coil and slidably engages the end of the armature to provide a low inductance electrical path and low reluctance magnetic path for the flux produced by the coil so that maximum dynamic response and output force are achieved.

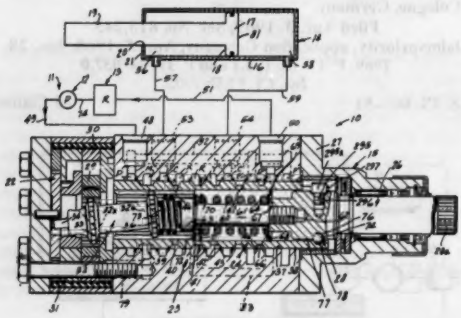
In one embodiment, the reciprocating solenoid armature operates as a pump piston to force hydraulic fluid in a selected path to move an actuator vane in a desired direction. In the alternative, a mechanical transmission such as a ratchet and pawl arrangement is employed to move the actuated member in the desired direction by an incremental amount during each energization of the solenoid coil.

3,587,235

REGENERATIVE HYDROSTATIC STEERING SYSTEM

Raymon L. Goff and Charles V. Gagen, Lafayette, Ind., assignors to TRW Inc., Cleveland, Ohio

Filed June 2, 1969, Ser. No. 829,493
Int. Cl. F15b *15/18*; B62d *5/00*
U.S. Cl. 60—52 **10 Claims**



A hydraulic power steering system including a one-piece hydrostatic unit connected to a main power fluid pump assembly and employing an axially shiftable directional control sleeve valve and a single hydraulic work cylinder connected to the hydrostatic unit. The free cross-sectional area on one side of the piston of the work cylinder is twice that of the other side. The hydrostatic unit includes a manually controlled operating shaft which, when turned in one direction, is effective to shift the sleeve valve axially in one direction, thereby causing all the fluid being pumped from the main pump assembly to the hydrostatic unit, as well as all the fluid being expelled from the reduced area end of the work cylinder, to enter the increased area end of the work cylinder. When the operating shaft is turned in an opposite direction the sleeve valve is shifted axially in an opposite direction, thereby causing all the fluid from the main pump assemble to enter the reduced area end of the work cylinder and the fluid being expelled from the increased area end to return to the main pump assembly.

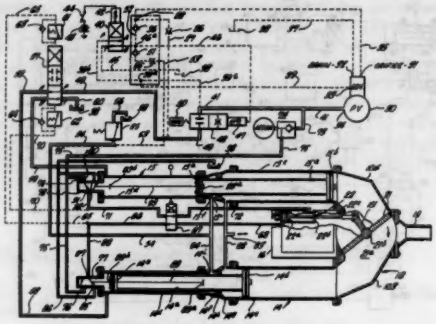
3,587,236

PUMP

Marvin D. Bennett, Long Beach, Calif., assignors to Royal Industries, Inc., Pasadena, Calif.

Division of Ser No. 716,546, Mar. 27, 1968, Patent No. 3,507,347, dated Apr. 21, 1970, which is a continuation of application Ser. No. 550,842, May 17, 1966, now abandoned, which is a division of application Ser. No. 359,628, Apr. 14, 1964, now Patent No. 3,279,382.
Filed Nov. 17, 1969, Ser. No. 877,130
Int. Cl. F15b *15/18*
U.S. Cl. 60—52 **4 Claims**

This invention relates to control means for a positive displacement pump for conveying and delivering concrete, mortar and like compressible materials. The control means in-



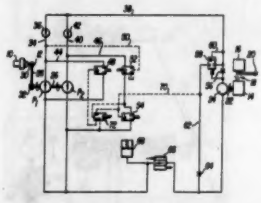
cludes remote control means for controlling the pump at the point of delivery of the pumped material from the pump.

3,587,237

CONSTANT SPEED DRIVE

Michael A. Pierrat, Andover, Mass., assignor to Automatic Radio Mfg. Inc., Melrose, Mass.

Filed May 23, 1969, Ser. No. 827,410
Int. Cl. F15b *15/18*
U.S. Cl. 60—53 **12 Claims**



A constant-speed rotary drive operating at high efficiency includes a hydraulic motor within a closed fluid circuit which has a fluid bypassing and multiple-pumping arrangement for maintaining a constant rate of fluid flow to the hydraulic motor. Two or more rotary pumps are driven at the same or related speeds by a variable-speed power input device, and an automatic valving arrangement, responsive to conditions characterizing the flows which must be bypassed to operate the motor at constant speed, selectively channels the output flows from the pumps in sequences and combinations which insure that the power losses associated with flow in the bypass for the hydraulic motor are minimized for all ranges of input-speed variations.

3,587,238

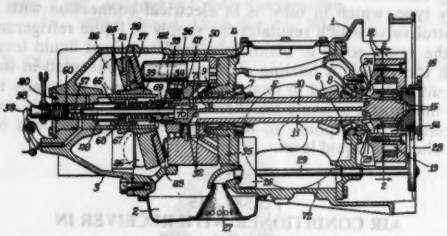
POWER-BRANCHED HYDROSTATIC VEHICLE TRANSMISSION

Hans Molly, 7502 Malsch Dr., Eugen-Essig-Strasse 48, Karlsruhe, Germany

Filed July 2, 1969, Ser. No. 838,428
Claims priority, application Germany, July 9, 1970, P 17 559.12.5
Int. Cl. F16d *31/06*
U.S. Cl. 60—53 **19 Claims**

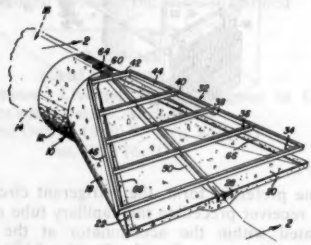
The transmission includes a casing having a main portion and an insert portion releasably connected. The output shaft is carried on spaced bearings in the insert. The output drive gear is between the bearings. On the output shaft, outboard of one bearing, is the housing of a sickle-type gear pump. Within the housing is a ring gear having a pinion inside it. The pinion is concentric with the output shaft and is connected to an input shaft. On the output shaft outboard of the other bearing is the cylinder block of an axial piston motor with the valve member of the motor between the cylinder block and said other bearing. Fluid passages extend through

the output shaft between the pump and the motor. The cylinders of the motor have relief passages uncovered by the pistons when the pistons reach the outward extent of their movement. The position of the motor swash plate is controlled by a pair of hydraulic servos on opposite sides of the



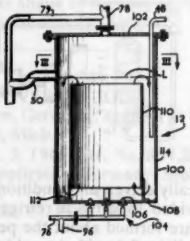
axis of the output shaft. A pressure operated slide valve to control the servos extends through and beyond the distal end of the output shaft. A control spring in this slide valve has a manual adjustment. The slide valve communicates with the servos through a directional control valve.

3,587,239
CULVERT BEVELLED END CONSTRUCTION WITH HEAVY GRATING
Ovalt A. Feland, 1205 6th Ave. East, Williston, N. Dak.
Filed Mar. 6, 1969, Ser. No. 804,796
Int. Cl. F16l 9/00; E01c 11/22
U.S. Cl. 61—16 **5 Claims**



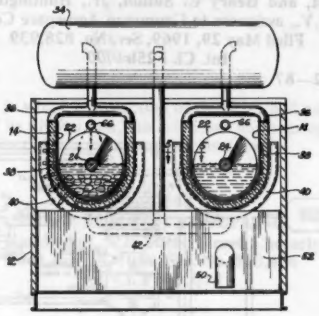
A culvert construction including a terminal end section bevelled downwardly and outwardly and provided with a suitably anchored inclined grate structure of heavy construction overlying and extending between the edges of the terminal end section defining the bevelled portions thereof.

3,587,240
DESALINATION
Allan Martindale, Bramhall; John T. Allanson, Didsbury, Manchester, and Bryan R. Parr, Sale, England, assignors to Simon-Carver Limited, Stockport, Cheshire, England
Filed May 8, 1967, Ser. No. 636,817
Claims priority, application Great Britain, May 25, 1966, 23340/66
Int. Cl. B01d 9/04; C02b 1/06
U.S. Cl. 62—58 **20 Claims**



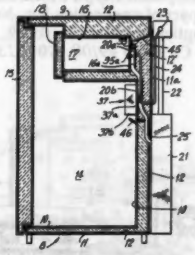
A method of desalinating saline water to produce fresh water comprising the steps of (a) injecting into the saline water a volatile liquid refrigerant immiscible with water, so that the refrigerant boils, causes ice crystals to form and causes circulation of a slurry of ice crystals around a baffle, (b) separating the ice crystals from their mother liquor, and (c) melting the separated ice crystals.

3,587,241
COOLING CONSTRUCTION FOR FOODS PRODUCTS
William F. Hagen, Denton, Tex., assignor to Turbo Refrigeration Company, Denton, Texas
Filed Nov. 6, 1968, Ser. No. 773,723
Int. Cl. F25d 17/02, 25/04
U.S. Cl. 62—63 **11 Claims**



A construction for chilling and freezing of food products comprising an elongated trough and means for introducing the products along with a cooling fluid into one end of the trough. A rotatable screw is located within the trough, and openings are provided to permit movement of the fluid along the trough at a relatively high rate. The fluid tends to carry the food products through the trough; however, the openings are insufficient to permit passage of the products and, therefore, the screw serves as a retarding means which provides for controlled movement of the food products through the trough at a rate lower than the rate of movement of the fluid.

3,587,242
ABSORPTION REFRIGERATOR
Amram Asher, Stockholm; Carl-Gosta Almen, Vallingby, and Karl Gunnar Boren, Skarholmen, Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden
Filed Aug. 28, 1969, Ser. No. 853,668
Int. Cl. F25d 11/02
U.S. Cl. 62—77 **13 Claims**



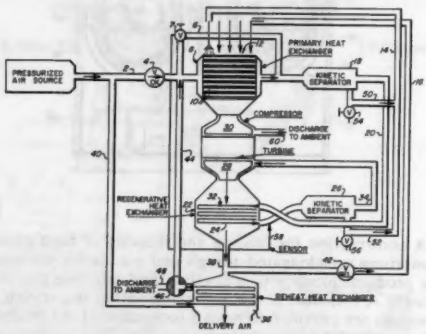
This invention relates to an absorption refrigerator of the inert gas type having low and higher temperature evaporator sections located outside the thermally insulated interior of the refrigerator cabinet. A shell, which is enveloped by insulation and defines the freezer compartment, has its flat rear vertical wall heat conductively connected to straight portions and connecting bend of vertical piping forming the low temperature evaporator section. A ribbed plate has a flat base

which is positioned at the inner surface of the rear vertical wall of the inner liner and covers an opening therein. The straight portions and connecting bend of vertical piping forming the higher temperature evaporator section are located at such opening and are heat conductively connected to the rear surface of the flat base. The ribbed plate has a plurality of spaced vertical ribs which are transverse to the flat base and project therefrom into the interior of the refrigerator cabinet.

3,587,243
PRECONDENSING REGENERATIVE AIR CYCLE SYSTEM

Robert A. Keller, Smithtown; Wayne L. McGough, Lyndenhurst, and Henry C. Sutton, Jr., Huntington Station, all of N.Y., assignors to Grumman Aerospace Corporation.

Filed May 29, 1969, Ser. No. 828,939
Int. Cl. F25b *9/00*
U.S. Cl. 62—87 **19 Claims**

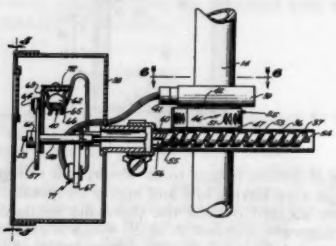


An apparatus and process for providing dehumidified, conditioned air for ground cooling of aircraft weapons systems equipment. An air conditioning system adapted to dehumidify and cool pressurized air by sequentially passing pressurized source air through a primary heat exchanger, moisture removal equipment, the hot side of a regenerative heat exchanger, additional moisture removal equipment, an expansion turbine and the cold side of the regenerative heat exchanger.

3,587,244
THERMAL DIFFERENTIAL SENSOR FOR REFRIGERATION SYSTEMS

Charles P. Wood, Jr., Cincinnati, Ohio, assignor to Midwest Research & Development Corp., Cincinnati, Ohio

Continuation-in-part of application Ser. No. 573;327, Aug. 18, 1966. This application Mar. 21, 1969, Ser. No. 809,174
Int. Cl. F25b *49/00*; **G01f** *23/00*
U.S. Cl. 62—126 **4 Claims**

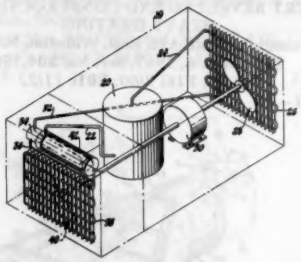


A liquid level control device for a refrigeration system having a vessel in which liquid refrigerant is accumulated at a low temperature. The control device comprises a thermostat clamped in thermal contact about a telltale tube which communicates with the vessel, the thermostat having a temperature-responsive element providing rotary movement in response to the temperature of the liquid level within the telltale tube. The temperature-responsive element is mechanically connected to an electrical switch, preferably of the mercury type, which in turn, is in electrical connection with a control valve which regulates the supply of liquid refrigerant to the vessel so as to maintain a predetermined liquid level with the vessel. A heating element is interconnected in the circuit and arranged to heat the telltale tube in proximity to the thermostat to cause the thermostat to react promptly and accurately in response to temperature changes induced by the changing liquid level.

3,587,245
AIR CONDITIONER WITH RECEIVER IN ACCUMULATOR

James W. Jacobs, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 18, 1969, Ser. No. 808,097
Int. Cl. F25b *41/06*
U.S. Cl. 62—503 **1 Claim**

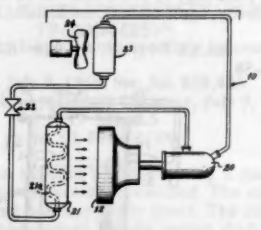


In the preferred form, the refrigerant circuit is provided with a receiver preceding the capillary tube restrictor which is located within the accumulator at the outlet of the evaporator for precooling the liquid refrigerant to substantially prevent electrostatic precipitation in the capillary tube restrictor.

3,587,246
AIR CONDITIONING SYSTEMS

Derek Howard, Stony Brook, N.Y., assignor to Fairchild Hiller Corporation, Montgomery County, Md.

Filed Aug. 22, 1969, Ser. No. 852,188
Int. Cl. F25b *1/00*
U.S. Cl. 62—501 **1 Claim**



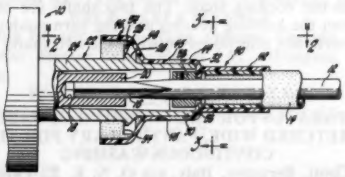
A pneumatically driven air conditioning system in which a turbine is provided to drive a refrigerant compressor. The turbine vanes are formed about the periphery of a loop carried by a plurality of fan blades which are fastened to the compressor shaft. The turbine driven fan also serves to drive the compressor, draw air through a condenser and provide

cooling for the refrigerant compressor and related mechanisms such as bearings and the like.

3,587,247
EARRING FORMED OF DISSIMILAR HALF RINGS
Lloyd F. Crisfield, Torrance, and Tobias S. Rosner, Los Angeles, Calif., assignor to Crisler Corporation
Filed Mar. 4, 1969, Ser. No. 804,163
Int. Cl. A44c *7/00*
U.S. Cl. 63—14 **4 Claims**

An earring structure embodied as a pair is disclosed, which engages the ear lobe to parallel the face. The earrings disclosed herein each include two distinctly different half rings, the ends of which are each similarly bevelled so that upon mating two ring halves together joints are defined which lie substantially in a plane extending through the ring which is offset from parallelism with the axis of the ring. A simple spring hinge is affixed at one of the joints so defined.

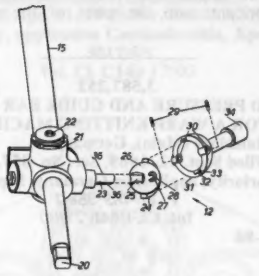
3,587,248
CABLE COUPLING
Romeo O. Umanos, Livonia, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Oct. 8, 1969, Ser. No. 864,791
Int. Cl. F16c *1/26*
U.S. Cl. 4—4 **3 Claims**



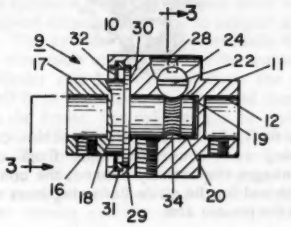
A coupling for connecting a drive cable to a rotary member wherein the coupling has an oval flexible ring joined to the main body of the coupling by two struts whereby the oval ring is adapted to snap over an annular flange on a boss of the rotary member to retain the coupling in place, but which can be released from the rotary member by pressing on the oval ring adjacent to the struts to bulge the sides of the oval ring so that the shape of the ring approaches a circle larger in diameter than the annular flange.

3,587,249
UNIVERSAL JOINT
Gunther Arnold, Hessen, Germany, assignor to General Motors Corporation, Detroit, Mich.
Filed Sept. 3, 1969, Ser. No. 854,835
Claims priority, application Germany, Sept. 5, 1968, P 17 75 642.2
Int. Cl. F16d *3/16*
U.S. Cl. 64—7 **5 Claims**

A universal joint has one half-joint guiding and partially enclosing a drive ball in such a way that the latter is movable about one of its rotation axes only, whilst the other half-joint includes a flattened shaft-end swivellable in the drive ball in a plane which includes said one rotation axis. The one half-joint is a hemispherical shell having a groove which is open at its end and in which a projection of the drive ball engages. At the ends of its pivotal axis, the drive ball has bearing slots for receiving pivot pins on the hemispherical shell.

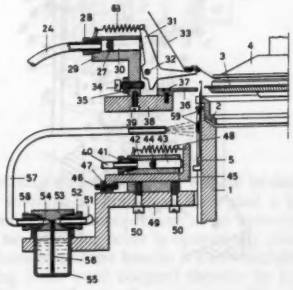


3,587,250
PHASE ADJUSTING COUPLING
Nicholas M. Raskhodoff, 5728 Euclid Street, Cheverly, Md.
Filed July 10, 1969, Ser. No. 840,686
Int. Cl. F16d *3/10*
U.S. Cl. 64—24 **1 Claim**



Coupling means interposed between two-in-line shafts which couple said shafts and provide phasing adjustment between said coupled shafts.

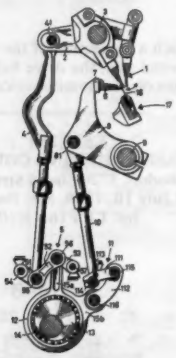
3,587,251
DEVICE FOR THE OPERATION OF MEMBERS IN CIRCULAR MACHINES FOR STOCKINGS, SOCKS AND THE LIKE
Armando Vincoli, Brescia, Italy, assignor to Santoni & C-S.P.A., Brescia, Italy
Filed Mar. 11, 1969, Ser. No. 806,106
Claims priority, application Italy, Mar. 11, 1969, 32656
Int. Cl. D04b *15/80, 15/82, 35/28*
U.S. Cl. 66—8 **3 Claims**



Circular knitting machine, particularly for the manufacture of stockings and the like, which includes only one manifold

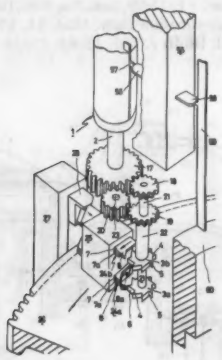
for controlling members or groups of members to be simultaneously by a fluid pressure actuated, there being provided independent valves controlling said members or groups of member. The members which are controlled are a displaceable guide, the displaceable needles, and an atomizer for spraying lubricant onto the parts of the machine to be lubricated.

3,587,252
COMBINED PRESSURE AND GUIDE BAR MECHANISM FOR A WARP KNITTING MACHINE
Karl Kohl, Hainstadt (Main), Germany
Filed Sept. 12, 1969, Ser. No. 857,528
Claims priority, application Germany, Sept. 18, 1968, P 17 785 388.2
Int. Cl. D04b *27/00*
U.S. Cl. 66—86 **3 Claims**



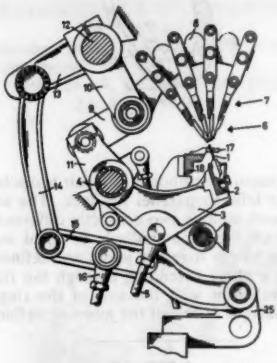
The drive shaft of a warp knitting machine carries an eccentric having two connecting rods fixed on its strap member. Linkages respectively connect the connecting rods with the push-rod on the guide-bar swing lever and with the push-rod on the presser arm.

3,587,253
CIRCULAR KNITTING MACHINES
Jose Maria Dalmau Guell, Badalona, Spain, assignor to S. A. Jumberca, Jacinto Benvanente S/H Badalona (Prov. Barcelona), Spain
Filed Oct. 21, 1969, Ser. No. 868,045
Claims priority, application Spain, Oct. 29, 1968, July 30, 1969, 359,705;370,045
Int. Cl. D04b *15/74*
U.S. Cl. 66—50 **10 Claims**



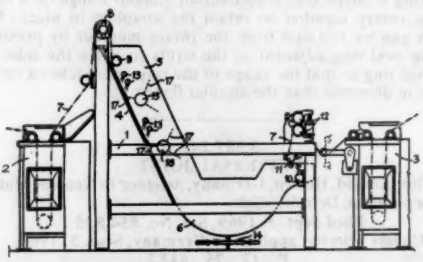
A mechanism comprising a toothed wheel coaxial with the shaft of a knitting instrumentality selector drum of the machine, two actuating pinions for said toothed wheel, each adapted to rotate it in opposite directions and movable cam means, adapted to actuate alternately said actuating pinions on being engaged by control cam means provided in the fixed part of the machine.

3,587,254
GUIDE BAR SWINGING MECHANISM FOR A WARP KNITTING MACHINE
Karl Kohl, Offenbacher Landstr. 20 Hainstadt (Main), Germany
Filed Sept. 19, 1969, Ser. No. 859,468
Claims priority, application Germany, Sept. 28, 1968, G6750484
Int. Cl. D04b *27/00*
U.S. Cl. 66—86 **3 Claims**



A warp knitting machine in which the carrier arms for the needle bar are pivotally mounted on the sinker-bar rocking shaft, and the guide bars for the yarn guides are mounted on one arm of a two-armed lever whose other arm is attached to the sinker-bar rocking shaft by a hinged link. The fulcrum of the lever is mounted on the free end of a radial arm fixed on the guide-bar rocking shaft. The two shafts are rearwardly offset from the knitting needles and the yarn guides, and the lever is vertically interposed between the two shafts.

3,587,255
APPARATUS FOR THE FINISHING OF FABRICS STRETCHED WIDE, PARTICULARY FOR THEIR CONTINUOUS WASHING
Fulvio Conti, Bergamo, Italy, c/o O. N. E. Z., Officine Meccaniche de Conti Dr. Inq. Fulvio Via Carnovali 88
Filed Nov. 26, 1968, Ser. No. 778,969
Int. Cl. D06c *17/04*
U.S. Cl. 68—38 **1 Claim**



This disclosure relates to an apparatus for the finishing of fabrics stretched wide, particularly for the continuous wash-

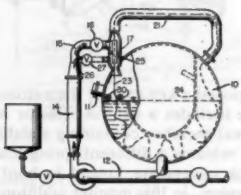
ing and/or fulling of fabrics, which comprises an inclined slide along which fabric to be finished is arranged to pass, feed means arranged to feed water or other liquid along said inclined slide on the surface of said fabric, at least one rotating shaft arranged to rotate transversally to the direction of advancement of the fabric, and a plurality of thrasher members provided on said rotating shaft for thrashing the surface of said fabric.

3,587,256

MACHINE FOR DYEING TEXTILE MATERIAL

Otto Alvar Spara, Avesta, Sweden, assignor to Avesta Jernverks Aktiebolag, Limited Company of Sweden

Filed Aug. 18, 1969, Ser. No. 850,871
Claims priority, application Sweden, Aug. 16, 1968, 11067
Int. Cl. B05c *11/124*
U.S. Cl. 68—177 4 Claims



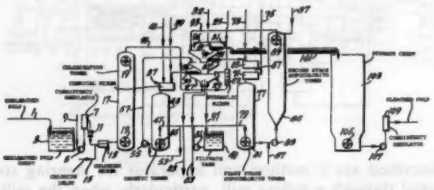
A textile dyeing machine of the type in which an endless string or rope of the textile material to be dyed is circulated in a closed path including a jet nozzle fed with dye bath under pressure and so shaped, that the dye bath jet leaving the same pulls along the textile rope, separate means being provided to brake the textile rope before its entrance into the rope driving jet nozzle, characterized in that the means for braking the textile rope consists of a jet nozzle fed with dye bath under pressure and directed oppositely to the driving jet nozzle.

3,587,257

BLEACHING SYSTEM INCLUDING A SINGLE, TRIPLE-DECK TABLE WASHER

Alfred Max Hurter, Beaconsfield, Quebec, Canada, assignor to Stadler Hurter International Ltd., Montreal, Quebec, Canada

Filed Oct. 9, 1968, Ser. No. 766,045
Claims priority, application Great Britain, Oct. 16, 1967, 47130/57
Int. Cl. D21c *9/02, 9/10*
U.S. Cl. 68—181 11 Claims



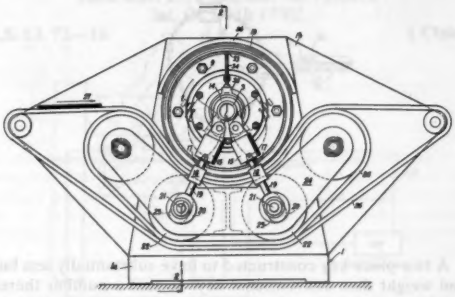
Apparatus used in the bleaching of pulp. Pulp is conveyed from a chlorination tower to a first deck of a three deck table washer. The washed pulp is then conveyed to a caustic treatment tower and after treatment therein conveyed to a second deck of the three deck table washer. After this second wash, the pulp is treated in a hypochlorite tower and thereafter washed on a third deck of the table washer. Each deck of the table washer has a circular, rotatable, horizontal screen thereon and a vacuum acts to draw the effluent wash water through the screen. The table washer can wash pulp at a consistency between 1½ and 5 percent.

3,587,258

THROUGH-FEED IRONING MACHINE

Bohuslav Plechac, Otrokovice, and Josef Mudrik, Lhota U Melenovice, Czechoslovakia, assignor to Statni Vyzkumny Ustav Kvzedelny, Gottwaldor, Czechoslovakia

Filed Apr. 21, 1969, Ser. No. 817,700
Claims priority, application Czechoslovakia, Apr. 24, 1968, 3017/68
Int. Cl. C14b *17/00*
U.S. Cl. 69—43 5 Claims



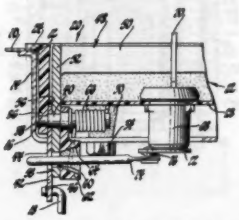
In a through-feed ironing machine used for applying treatments such as ironing, embossing, and the like to sheet materials such as leather, cardboard, and the like a frame of the machine carries a cantilever support shaft which in turn carries a support means that serves to support a rotary ironing cylinder. This cylinder coaxially surrounds the cantilever shaft and is removably connected with the support means so that the cylinder can be displaced from the machine by movement off from the shaft over a free end thereof which is distant from the frame. The cylinder can be replaced by the reverse operation. Pressure rollers are provided to coact with the cylinder. The journals of the pressure rollers are carried by a suspension which in turn is carried by and extends radially from the cantilever shaft so that it is this shaft which carries both the ironing cylinder and pressure rollers of the machine.

3,587,259

LATCH OPERATING ARRANGEMENT

Bela Sandor, Detroit, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 17, 1969, Ser. No. 877,289
Int. Cl. E05b *13/00, 5/00*
U.S. Cl. 70—218 4 Claims

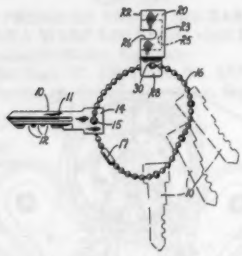


A latch operating arrangement for vehicle bodies includes a handle unit wherein an operating lever and a handle are rotatably mounted on a common axis of an escutcheon fixed to the door. The operating lever is operatively connected to the latch mechanism and the handle is freewheelable relative to the operating lever until coupled thereto by lock means mounted on the escutcheon whereupon rotation of the handle operates the door latch mechanism through the operating lever.

3,587,260
TWO-PIECE KEY

Akira Tajiri, 19371 E. Parlier Ave., Reedley, Calif. 93654

Filed Apr. 24, 1969, Ser. No. 818,911
Int. Cl. E05b 19/04
U.S. Cl. 70—395 5 Claims

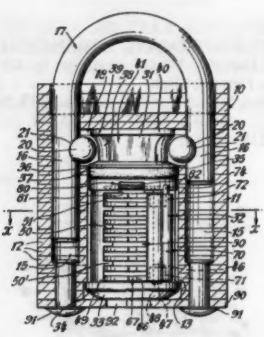


A two-piece key constructed to have substantially less bulk and weight than conventional keys so that a number thereof can be carried without inconvenience providing an elongated blade having an integral shank and a key manipulating member releasably connectable to the shank to provide sufficient turning leverage for the blade to permit ready manipulation of the key during use with a plurality of similar key blades being conveniently carried and selectively employed with the single key manipulating member.

3,587,261
PLUGS FOR KEY OPERATED LOCK MECHANISMS

Daniel Victor Berry, Bracknell, England, assignor to Ingersoll Locks Ltd., London, England

Filed Jan. 23, 1970, Ser. No. 5,219
Int. Cl. E05b 15/16, 29/10, 67/22
U.S. Cl. 70—422 19 Claims

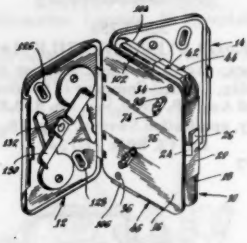


A key operated plug assembly for a locking mechanism the plug being adapted to be pivotally mounted in a body, which plug comprises body engaging means to prevent pivotal movement of the plug within the body, the body engaging means being rendered inoperative by the insertion into the plug of an appropriate key, a face element having therein a key receiving opening and being connected to the remainder of the plug by means of a collapsible connection, the arrangement being such that when more than a predetermined force is applied to the face element the collapsible connection fails so that the face element rotates relative to the remainder of the plug.

3,587,262
KEY CASE

Ronald H. Kaye, Fairfield, Conn., assignor to Swank, Inc., New York, N.Y.

Filed Nov. 4, 1969, Ser. No. 873,852
Int. Cl. A45c 11/32
U.S. Cl. 70—456 11 Claims

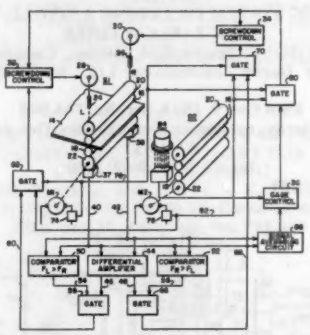


There is disclosed a key case of the automatic key selector type. The case includes a central selector mechanism comprising a channel member containing slidable latch buttons, each of which releases a different spring loaded key holder. Front and back covers are hinged in book fashion to the selector mechanism. In this manner additional key storage is provided, construction is simplified, the case may be made smaller, and the range of materials usable for the case is increased.

3,587,263
METHOD AND APPARATUS FOR STEERING STRIP MATERIAL THROUGH ROLLING MILLS

Joseph A. McCarthy, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1968, Ser. No. 782,599
Int. Cl. B21b 37/00
U.S. Cl. 72—8 12 Claims

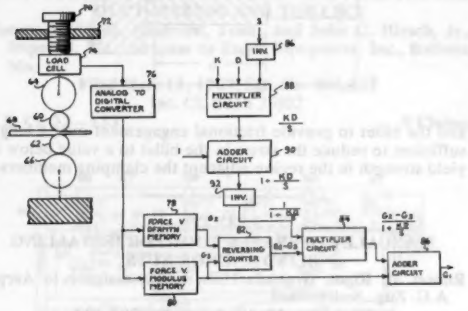


Described are a method and apparatus for steering strip material through a rolling mill, particularly when the mill is being threaded, in a manner to prevent the strip from turning off the center line of the mill due to camber (i.e., one edge of the strip being thicker than the other). This is accomplished by adjusting the spacing between the rolls at their opposite ends so as to equalize the roll forces on opposite edges of the strip as it is threaded through the rolls. After the strip is threaded through the rolls and tension applied thereto, either by a succeeding roll stand or by a coiler, the rolls can be adjusted to maintain the spacing between their opposite edges the same or nearly the same. The invention also encompasses strip steering for other purposes as well as strip steering in combination with strip shaping and gage control.

3,587,264
METHOD AND APPARATUS FOR ESTIMATING WORKPIECE GAGE IN A REDUCING MILL

Donald J. Fapiano, Scotia, N.Y., assignor to General Electric Company

Filed Apr. 28, 1969, Ser. No. 819,729
Int. Cl. B21b 37/00
U.S. Cl. 72—8 10 Claims

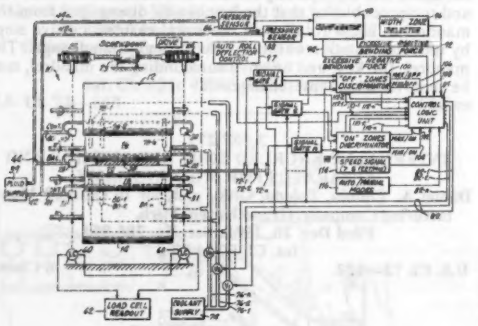


A gage estimating method and apparatus for use in a plate rolling mill. Using measured roll separating forces, mill stretch curves, and plate deformation curves, a range of uncertainty as to measured gage is established. The value of the range of uncertainty is modified as a function of the predicted draft, the predicted mill stretch, and the relative probability of error in predicting draft and stretch. The modified value determines the value of the estimated gage within the range of uncertainty.

3,587,265
AUTOMATIC THERMAL CROWN CONTROL OF STRIP MILL ROLLS

Olivio G. Sivilotti, Kingston, Ontario, Canada, assignor to Alcon Research and Development Limited, Montreal, Quebec, Canada

Filed Jan. 3, 1969, Ser. No. 788,705
Int. Cl. B21b 37/00
U.S. Cl. 72—8 54 Claims

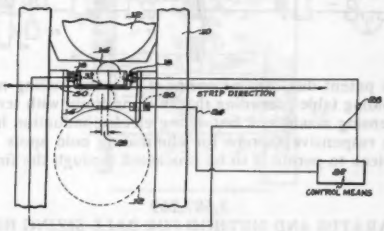


A system for controlling thermal crown of strip mill rolls. Thickness variations or off-flatness of the rolled strip are sensed at a plurality of zones across the strip, as well as excessive bending forces at the roll jacks. Zones inside the edges of the strip are controlled primarily in accordance with thickness variations or off-flatness, while zones outside the edges of the strip are controlled primarily in accordance with excessive bending forces. Zones at the edges of the strip are manually controlled. Manual and automatic control may be concurrently utilized. Provision is made to ensure that coolant flows are not changed within a predetermined time following a preceding change, except for changes in accordance with excessive bending forces at the roll jacks. The detection of maximum and minimum strip thicknesses or conditions of off-flatness for both zones to which coolant is being supplied and zones to which no coolant is being supplied is utilized with coolant flows being varied to these particular zones.

3,587,266
METHOD AND APPARATUS FOR ROLLING FLAT MATERIAL IN ROLLING MILLS OR THE LIKE

Erasmus A. Randich, Pittsburgh, Pa., assignor to Allegheny Ludlum Steel Corporation, Brackenridge, Pa.

Filed Mar. 27, 1968, Ser. No. 716,478
Int. Cl. B21b 17/02
U.S. Cl. 72—16 1 Claim

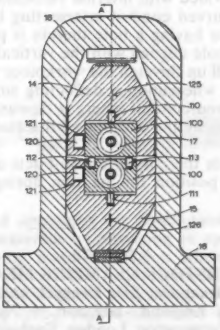


A method and apparatus whereby one of the work rolls in a conventional rolling mill is horizontally displaced with respect to the cooperating work roll so that as the material to be rolled approaches the bite of the roll, it contacts and is wrapped slightly over one of the rolls thus dampening the material to eliminate fluttering and guttering and presenting a flat surface for reduction in the roll bite.

3,587,267
STOCK TENSION CONTROL IN ROLLING MILLS

Nicholas A. Townsend, Kent, and Roy R. Oxlade, London, Great Britain, assignor to the British Iron and Steel Research Association

Filed Nov. 14, 1968, Ser. No. 775,593
Claims priority, application Great Britain, Nov. 15, 1967, 52087/67
Int. Cl. B21b 37/06
U.S. Cl. 72—21 18 Claims



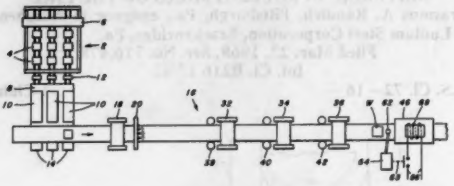
A rod or bar rolling mill stand wherein the two work rolls are each mounted on a free end of, and driven by, a respective work roll drive shaft. A common axis is defined extending perpendicular to and displaced from the stock pass line. The common axis intersects the shaft axes at points fixed on the shafts. The shafts are pivotally movable about the common axis. Load sensing devices are disposed acting between each shaft and the mill frame, whereby the devices give signals representative of the stock tension adjacent the mill stand.

3,587,268

WORKPIECE TEMPERATURE EQUALIZATION IN ROLLING OF STEEL

Francis H. Bricmont, 905 Bridgewater Drive, 15216, and Ervin R. Pritchett, 718 Robinwood Drive, 15220, both of Pittsburgh, Pa.

Filed Sept. 17, 1968, Ser. No. 760,225
Int. Cl. B21b 37/10
U.S. Cl. 72—13 3 Claims



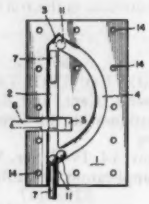
This patent discloses providing a hot-strip rolling mill, at the holding table preceding the finishing train, with temperature-sensing means and fast-acting electric-induction heating means responsive thereto for eliminating cold spots in the workpiece to permit it to be processed through the finishing train.

3,587,269

APPARATUS AND METHOD FOR BALL SIZING HOLES IN WORKPIECES

Robert J. Seccombe, Detroit, and Jack E. Willson, Livonia, Mich., assignor to Ingersoll-Rand Company, New York, N.Y.

Filed June 6, 1969, Ser. No. 831,166
Int. Cl. B21j 9/00
U.S. Cl. 72—75 7 Claims



A block is provided with internal vertical and curved conduits, with the curved conduit intersecting the vertical conduit. A workpiece having a hole therein is placed in a work station with the hole aligned with the vertical conduit. A ram drives a sizing ball up through the workpiece to the top of the vertical conduit, whereupon a deflecting surface moves the ball into the curved conduit where it descends under the influence of gravity to the bottom of the curved conduit for reuse.

A second ball in the curved conduit acts as a gate to keep the first ball in position on the ram during initial upward movement.

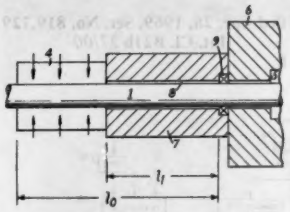
3,587,270

FEEDSTOCK CLAMPING MEANS

John Malcolm Alexander; Bela Lengyel, and Peter Guy Ashford, London, England, assignor to National Research Development Corporation, London, England

Filed Sept. 3, 1968, Ser. No. 757,076
Claims priority, application Great Britain, Sept. 8, 1967, 41248/67
Int. Cl. B21d 22/10
U.S. Cl. 72—60 6 Claims

In a clamping arrangement for clamping a feedstock billet extending into a high pressure chamber against axial forces which act along the length of the billet and are sufficiently large to develop stresses greater than the yield stress of the billet material, a portion of the feedstock billet is clamped between clamping members. The clamping members are separated from the interior of the high pressure container by a passage capable of passing the billet when the chamber is not under pressure. When the pressure in the chamber is high, relative deformation occurs between the passage wall



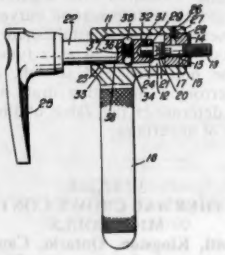
and the billet to provide frictional engagement over a length sufficient to reduce the stress in the billet to a value below its yield strength in the region adjacent the clamping members.

3,587,271

MANUALLY OPERABLE TOOL FOR INSTALLING BLIND ANCHOR NUTS

Robert M. Rigot, Granada Hills, Calif., assignor to Aerpat A.G. Zug., Switzerland

Filed Mar. 19, 1969, Ser. No. 808,492
Int. Cl. B21j 15/12; B21d 39/04
U.S. Cl. 72—114 10 Claims



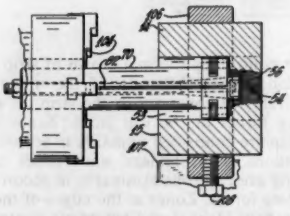
A manually operable tool for installing blind anchor nuts has a threaded mandrel which can be rotated by a shaft having at one end a key engaging a socket on the mandrel and at the other end a projecting handle. The shaft is both rotatable and reciprocable, so that the key can be disengaged from the mandrel to allow rotation of the mandrel in successive steps by repeated rotation of the handle through a small angle. The mandrel, the key, and an anvil surrounding the mandrel, may be removable and interchangeable.

3,587,272

INTERNALLY KNURLED BODY AND METHOD AND APPARATUS FOR FORMING SAME

Daniel A. Zmuda, Toledo, Ohio, assignor to Oldberg Manufacturing Company, Grand Haven, Mich.

Filed Dec. 26, 1968, Ser. No. 786,981
Int. Cl. B21d 3/02
U.S. Cl. 72—122 6 Claims



The disclosure embraces an internally knurled body and particularly a clamp body construction of a character for

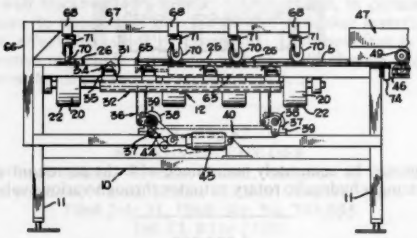
clamping cylindrical bodies or tubing or the like wherein the internal surfaces of the clamp construction are knurled to provide diamond-shaped gripping surfaces for exerting high gripping force, and to an apparatus or tool and method of using same to form diamond-shaped knurling or interior surface areas of a body.

3,587,273

CONVEYORIZED EDGE PROCESSING APPARATUS FOR DUCT-MAKING AND THE LIKE

George B. Smith, Nashville, Tenn., and John C. Hirsch, Jr., Imperial, Mo., assignor to Engel Equipment, Inc., Ballwin, Mo.

Filed Mar. 11, 1969, Ser. No. 806,245
Int. Cl. B21b *39/02*
U.S. Cl. 72—133 9 Claims



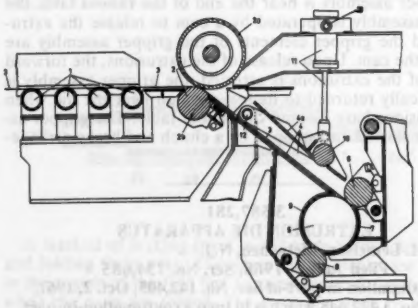
For forming sheet metal ducts, conveyed rectangular blanks are bent along their forward and rear edges to permit locking these edges together. Each blank is fed, with precision, along a guide abutment, laterally off of a first conveyor into an adjacent roll former, where its forward edge is formed. The blank is discharged onto a second, oppositely moving conveyor, from which it is again fed with precision, along a guide abutment, laterally into a second roll former which forms its opposite edge. As each blank is pushed laterally it is guided, as by partially castering rollers, along the guide abutment.

3,587,274

STRIP COILER

Friedrich Rotter, Kredenbach Kreis, Siegen, Germany, assignor to Siegener Maschinenbau, G.m.b.H.

Filed Nov. 12, 1968, Ser. No. 774,727
Claims priority, application Germany, Nov. 18, 1967, P 16 02 349.7
Int. Cl. B21c *47/00*; B21d *7/04, 5/14*
U.S. Cl. 72—148 5 Claims



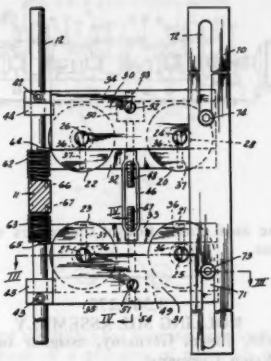
The disclosure relates to a hot strip downcoiler in which, in addition to the wrapper roller assembly arranged around the mandrel, an adjustable bending roller is arranged adjacent to the first wrapper roller in the throat of the coiler.

3,587,275

EDGE ROLLING MECHANISM

Francis P. Brennan, 1057 Rolling Drive, Lisle, Ill. 60532

Filed Aug. 21, 1968, Ser. No. 754,231
Int. Cl. B21b *31/00, 39/00*
U.S. Cl. 72—199 9 Claims



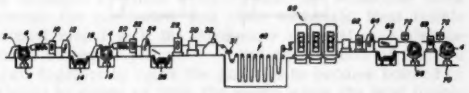
A two-stage strip material edge rolling apparatus comprises two pairs of grooved rollers mounted on upper and lower frame members that are pivotally connected to a rigid frame system of side frame members, spacer means and a mounting rod. A spring biased mounting means allows the apparatus to be counterbalanced in "free-floating" position to accept changes in the angle of feed of material. A wide range of material widths may be accepted by the flexible width adjustments and lateral curvatures or deviations of the material are readily accommodated by the pivotally mounted rollers. Groove configuration on the first pair of rollers is V-shaped while the last pair of rollers has a U-shaped configuration so the final material edge is smoothed.

3,587,276

PROCESS AND APPARATUS FOR CONTINUOUSLY PROCESSING STEEL AND OTHER MATERIALS

Erasmus A. Randich, Pittsburgh, Pa., assignor to Allegheny Ludlum Steel Corporation, brac

Filed Nov. 14, 1968, Ser. No. 775,720
Int. Cl. B21b *41/00*
U.S. Cl. 72—227 5 Claims



A method and apparatus for continuously rolling metal strip and other materials by providing an apparatus to accumulate the moving material so that when performing an operation in the process that requires the material to be stationary the rolling mill and/or processing section can operate without changing speed by drawing from the accumulated material.

3,587,277

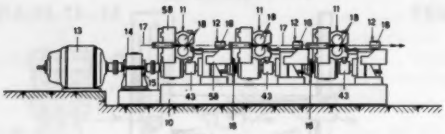
CONTINUOUS ROLLING MILL

Umberto Pigni, and Luigi Forni, Castellanza, Italy, assignor to Pomini Farrel S.P.A. Castellanza (Varese) Italy

Filed Dec. 23, 1968, Ser. No. 786,186
Claims priority, application Italy, Sept. 30, 1968, 21884A/68
Int. Cl. B21b *13/08, 35/00*
U.S. Cl. 72—234 8 Claims

Continuous rolling mill comprising a series of rolling stands, having rollers mounted in cantilevered fashion and with axes in successive stands mutually orthogonal, each

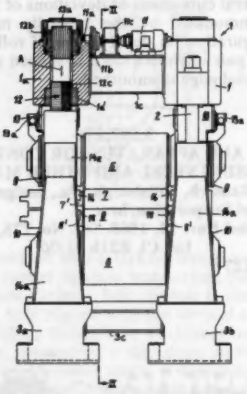
stand comprising in addition means for adjusting the working distance between the surfaces of the rollers and means for regulating the axial translation of the rollers with respect to the rolling line.



3,587,278
ROLLING MIL ASSEMBLY

Robert Kracht, Essen, Germany, assignor to Fried Krupp G.m.b.H. Essen, Germany

Filed May 24, 1968, Ser. No. 731,802
Claims priority, application Germany, May 30, 1967, P 16 02 030.7
Int. Cl. B21b *31/04, 31/24*
U.S. Cl. 72—237 6 Claims



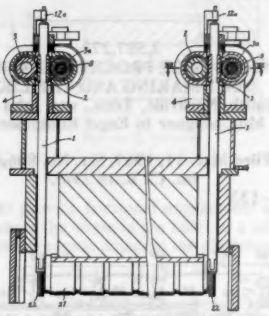
A rolling mill with freestanding upper and lower support rollers clamping a pair of working rolls between them under prestress arising from tensioning rods spanning upper and lower beams of the mill structure so that the rolling pressure acts counter to the prestress and relieves eccentrics disposed between the uprights and the upper beam for adjustment of the rolling gap.

3,587,279
FAST RESPONSE SCREWDOWN SYSTEM FOR ROLLING MILLS

Michael G. Sendzimir, and Lewis R. Seeling, Waterbury, Conn., assignor to T. Sendzimir, Inc., Waterbury, Conn.

Filed July 25, 1968, Ser. No. 747,519
Int. Cl. B21b *31/22*
U.S. Cl. 72—240 2 Claims

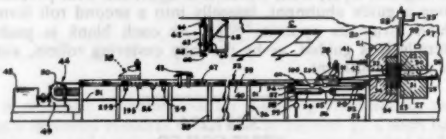
A fast response screwdown control system especially useful with the Sendzimir type cluster mill. A manually settable input is provided for a servocontroller as well as a feedback from the screwdown train to the servocontroller whereby gauge may be accurately maintained with the servocontroller operating a hydraulic rotary actuator through various valves.



3,587,280
METHOD AND APPARATUS FOR PULLING EXTRUSIONS FROM AN EXTRUSION PRESS

Max Engelhardt, Chicago, and Kurt F. Ziehm, Jr., Bensenville, Ill., assignor to Xpress Automation, Inc.

Filed Jan. 21, 1965, Ser. No. 426,817
Int. Cl. B21b *37/06;* B21c *23/00, 35/00*
U.S. Cl. 72—257 12 Claims



There is disclosed an extrusion puller including a gripper assembly slidable on a runout table away from and toward a die of an extrusion press. The gripper assembly includes a plurality of individual gripper elements engageable with one or more extrusion surfaces of the extrusions. When the gripper elements are triggered into engagement with the extrusion surfaces, the extrusions are gripped and the gripper assembly is driven toward the end of the runout table. When the gripper assembly is near the end of the runout table the gripper assembly is operated by a cam to release the extrusions and the gripper elements of the gripper assembly are reset by the cam. Upon release of the extrusions, the forward motion of the extrusions is arrested, the gripper assembly is automatically returned to its rest position near the die when the extrusions have cleared the runout table. The gripper assembly is started and stopped by a clutch and brake arrangement.

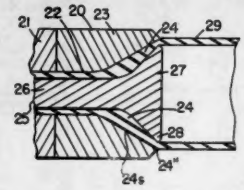
3,587,281
EXTRUSION DIE APPARATUS

Jerome H. Lemelson, Metuchen, N.J.

Filed June 5, 1968, Ser. No. 734,685
Continuation-in-part-of Ser. No. 142,405, Oct. 2, 1961, Pat. No. 3,422,648 which is in turn a continuation-in-part of Ser. No. 691,622, Oct. 22, 1957, Pat. 3,002,615.
Int. Cl. B21c *23/20*
U.S. Cl. 72—265 10 Claims

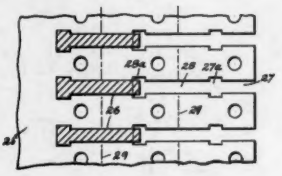
An extrusion die including a mandrel and means for relatively moving the mandrel and the die to produce extrusions of different or variable cross sections. In one form, the mandrel is longitudinally movable in the die and has different

portions of different shape which, when predeterminately positioned in the die opening, produce extrusions of different shapes. In another form, the mandrel head tapers outwardly and is longitudinally movable within the die to permit varying



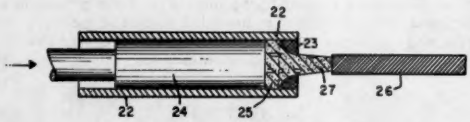
the wall thickness of a tubular extrusion and, in certain instances, to completely stop the flow of extrusion material so as to effect the cutoff of extrusions. The apparatus is also operative to provide extrusions with openings therein and extrusions having r.ised and recessed portions.

3,587,282
EXTRUSION CUT-OFF
Paul Loewenstein, Lincoln, Mass., assignor to Whittaker Corporation, Nuclear Metals Division, Concord, Mass.
Filed July 31, 1968, Ser. No. 749,055
Int. Cl. B21c *25/00*
U.S. Cl. 72—273 **6 Claims**



An extrusion follower block to be positioned behind a billet is provided with an outer portion of material more readily deformed than the billet and inner members less readily deformable than the billet.

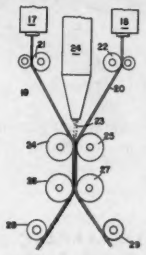
3,587,283
METHOD OF MAKING SHEET METAL PARTS
Richard P. Davis, 28 Arch Street, Laconia, N.H.
Filed Oct. 14, 1968, Ser. No. 767,524
Int. Cl. B21d *31/02*; **B21c** *37/02*; **B21d** *53/00*
U.S. Cl. 72—329 **1 Claim**



A method of making sheet metal parts by punching blanks and folding them over. The edges of the blanks are indented in the region of the fold line to compensate for material flow when the parts are folded. The parts are made by trimming, using punches with enlarged heads which form the indentations. The sheet is indexed so that the rear of the punch overlaps the cut made by the enlarged head on the previous stroke, to prevent draw-down burr.

This invention relates to the manufacture of sheet metal parts which are punched as blanks from a strip of metal and folded over.

3,587,284
METHOD FOR PRODUCING A COMPOSITE MATERIAL
Jerome H. Lemelson, 85 Rector Street, Metuchen, N.J.
Continuation-in-part of application Ser. No. 432,924, Jan. 8, 1965, now Patent No. 3,346,220, and a continuation-in-part of 641,101, Feb. 19, 1957, now Patent No. 3,173,195. This application Oct. 10, 1967, Ser. No. 674,343
Int. Cl. B21b *15/00*, *45/00*
U.S. Cl. 72—363 **5 Claims**



A method and apparatus for forming composite articles on a continuous basis of a plurality of materials fed together. The technique involves disposing particulate material between two members such as sheets of metal and forcing one sheet against the other such as by feeding the two sheets to the bite of rollers which are operative to compress the sheets and cause the particulate material therebetween to become pressed into the facing surfaces of either or both the two sheets.

The sheets may be thereafter separated with portions of the particulate material mechanically secured to the surface stratum of either or both the sheets depending upon the characteristics of the two materials. The particulate material may be used as frictional or abrasive material per se or further processing of the composite material may result in providing a layer on the surface of the sheet material which layer includes the particulate material.

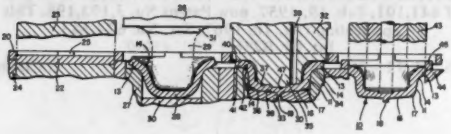
The two sheets may comprise sheets of metal such as aluminum or other suitable nonferrous metal, or one sheet of a softer material such as aluminum may be compressed by a sheet of a substantially harder material such as steel to force the particulate material into the softer sheet. In another embodiment, one of the two sheets may be substantially softened by reason of its temperature being elevated so as to render same more easily deformable and to permit the particulate material to be forced into the surface stratum thereof for mechanically securing the individual particles thereto.

In another form, the particulate material is heated to a temperature to cause the individual particles to at least partially fuse or weld to either of the sheets between which they are disposed to effect a mechanical and molecular bond between the particulate and sheet materials. Heat fusible material mixed with the particulate material may also be heated during or just prior to the compression of the two sheets together to cause the particles to become bonded or adhered to either or both the sheets when the heat fusible material solidifies after the sheets are driven together.

3,587,285
METHOD OF FORMING WELDING STUDS FROM SHEET-LIKE MATERIAL
Ricardo Gonzalez, Milwaukie, Oreg., assignor to Omark Industries, Inc., Portland, Oregon
Continuation-in-part of application Ser. No. 699,746, July 24, 1967, now abandoned , which is a division of application Ser. No. 431,054, Feb. 8, 1965, now Patent No. 3,415,414. This application Oct. 11, 1968, Ser. No. 766,907
Int. Cl. B21c *37/02*
U.S. Cl. 72—379 **10 Claims**

The method of working the surface of a substantially flat metallic member to make it suitable for high current density welding to a similar flat surface which includes forming, by impact extrusion, a discrete and finite weld base area on the surface of the metallic member characterized by a frustoconical weld base area having a sharp peripheral edge and an extended welding tip disposed axially of the

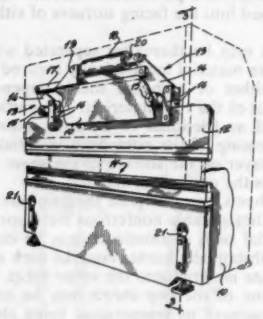
frustoconical base. The flat metallic member may initially be deep drawn to form a cuplike member prior to the extrusion process forming the weld base area. In particular embodiments, the cup-shaped member may be internally threaded or an external flange formed thereon to provide additional fastener means for the stud.



3,587,286
PRESS BRAKE

Rezso Fritsch, 10,262 Avenue London, Montreal, Quebec, Canada

Filed Dec. 6, 1968, Ser. No. 781,949
Int. Cl. B21d *5/01*
U.S. Cl. 72—389 4 Claims



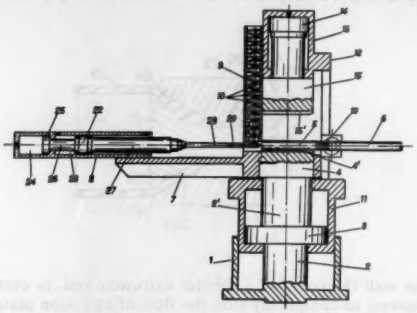
The disclosure relates to a press brake comprising a frame, a bed mounted on the frame and a ram adapted to move towards the bed. Mechanical linkages are provided one at each end of the ram for interconnecting the ram to the frame of the press brake. Such mechanical linkages are operated simultaneously to ensure parallel movement of the ram towards the bed regardless of uneven loading of the press. In a preferred embodiment of the invention, each mechanical linkage comprises a lever member pivotally mounted on the frame of the press brake and having one end thereof connected to the ram by means of two links located one on each side of the ram. The other end of the two lever members are interconnected by means of a suitable bar and such bar is operated by a single operating device. In addition, an adjusting wedge is provided adjacent each end of the bed for tilting the bed.

3,587,287
AUTOMATIC MACHINE FOR PREPARING THE ENDS OF METAL PIPES FOR THE DRAWING OPERATION

Michelangelo Vacca, Florence, Italy, assignor to Societe Metallurgica Italiana, Florence, Italy

Filed Nov. 7, 1968, Ser. No. 774,144
Claims priority, application Italy, Nov. 9, 1967, 53656-A/67
Int. Cl. B21d *41/00*
U.S. Cl. 72—402 2 Claims

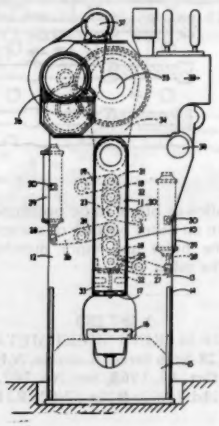
A machine which automatically performs the operations for preparing the extremities of metal pipes prior to drawing is disclosed. The machine introduces lubricating oil and a drawing mandrel to the inside of the pipe, produces one or more dents on said pipe, to stop and position the said mandrel and forms the extremity of the pipe to the desired shape and dimensions required by the pipe-drawing machine.



3,587,288
PRESSES

John C. Sharman, Walsall, England, assignor to G. K. Engineering Ltd., Wolverhampton, England

Filed May 13, 1969, Ser. No. 824,033
Int. Cl. B21j *9/02*
U.S. Cl. 72—450 9 Claims



A press in which the ram is mounted for rectilinear movement between a pair of frame members of the press and in which a linkage system is provided operative between the ram and the frame members of the press to ensure that the ram moves rectilinearly or substantially so.

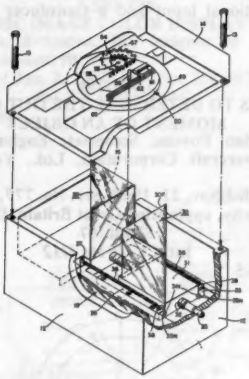
3,587,289
OPTICAL MICROMETER

John L. Plummer, Wynnewood, Pa., assignor to Plummer & Kershaw, East Greenwich, Pa.

Filed July 3, 1969, Ser. No. 838,883
Int. Cl. G01b *11/00*; G01p *21/00*
U.S. Cl. 73—1 DV 3 Claims

An optical device is disclosed for calibrating measuring instruments. The device may be used, for example, to calibrate electronic instruments for measuring vibrations of a physical body. The device includes a pair of reflecting surfaces, which may be a pair of triangular prisms, one of which is fixed mounted and the other which is adjustably movable relative to the first for producing displacement of the image, thereby

to simulate displacement of a fixed target. A dial gauge provides a precise indication of the displacement of the second



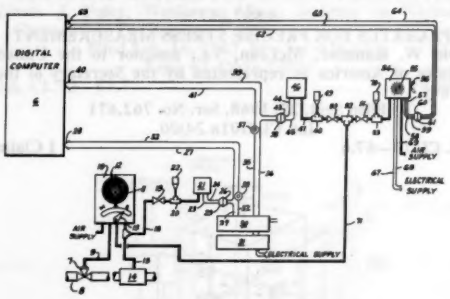
reflecting surface, thereby providing a precise and accurate indication of the simulated displacement of the target.

3,587,290

TEST APPARATUS FOR PROCESS COMPUTER INTERFACE INSTRUMENTATION

George D. Beauchamp, and James M. Ware, Port Arthur, Tex., assignor to Texas-U.S. Chemical Company, Parsippany, New Jersey

Filed Sept. 18, 1969, Ser. No. 859,051
Int. Cl. G01n *18/00*; **G05b** *23/00*
U.S. Cl. 73—1R **6 Claims**



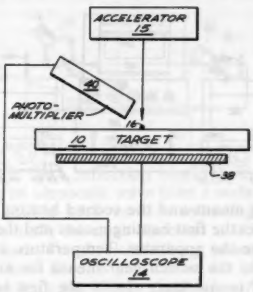
A control loop interface between a digital computer and a pneumatically operated regulator for an industrial process variable includes various converters in the computer output and feedback circuits and the pneumatic piping. Cutoff valves and manometer connections are provided in the piping between each converter and the regulator, and connectors are provided in the computer output and feedback wiring so that each instrument may be isolated from the system, while coincidentally locking the regulator in the operating condition of the moment. Suitable test instrumentation is then applied to the connectors for indicating the operation of the particular segregated instrument. Preferably, the various pneumatic couplings, electrical connectors, and valve actuators are provided on a conveniently located test panel. Where a multiplicity of variables are computer controlled, as is usually the case, all of the test panels will be conveniently grouped so that a relatively unskilled workman can test all of the interface instruments in a relatively short time.

3,587,291

PARTICLE DETECTION METHOD AND APPARATUS

Edward Andrew Escallier, Norwalk, and Charles Norman Scully, Brea, Calif., assignor to North American Rockwell Corporation, El Segundo, California

Filed Mar. 26, 1968, Ser. No. 716,186
Int. Cl. G01n *3/08*
U.S. Cl. 73—12 **3 Claims**



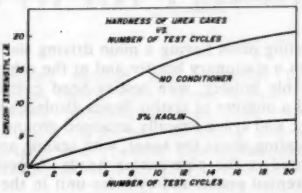
A particle impact detection apparatus which includes a target formed of a dielectric or metallic material, and a sensor, formed of an electrically conductive material, connected to or disposed in close proximity to the target. Upon impact of a hypervelocity particle on the target, a voltage signal appears on the sensor. The signal varies in amplitude with the mass and velocity of the particle, and with the target materials. The apparatus, used in conjunction with a second detection apparatus, provides a means for determining both the mass and velocity of the impacting hypervelocity particle.

3,587,292

METHOD FOR DETERMINING SUSCEPTIBILITY OF UREA TO CAKING ON AN ACCELERATED BASIS

Richard Lapham Gilbert, Jr., Princeton, and Paul William Knapp, Yardville, N.J., assignor to American Cyanamid Company, Stanford, Conn.

Filed Apr. 10, 1969, Ser. No. 814,988
Int. Cl. G01n *25/00*, *3/48*
U.S. Cl. 73—15.4 **4 Claims**



Urea in any of a variety of forms, either with or without anticaking additives, is placed in a perforated mold and subjected to an environmental cycle comprising a first half cycle of a high temperature-low humidity environment and a second half-cycle of a low temperature-high humidity environment to thereby simulate a typical diurnal cycle. The urea is maintained at a pressure of 2 to 6.5 p.s.i.g., during the cycle and from 2-½to 20-½cycles are required to produce useful results. The method produces accurate and useful quantitative data with test durations as short as 0.3 days although a test period of 2—4 days is preferable. The method finds utility by providing a quick evaluation of the efficacy of various urea anticaking additives.

3,587,293

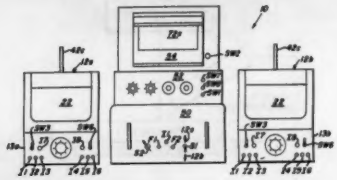
APPARATUS FOR MEASURING THE SOFTENING POINT OF A SOLID

Glenn E. Bowers, McKeesport, and Richard E. Edwards, Jr., Bethel Park Borough, Pa., assignor to United States Steel Corporation

Filed Aug. 15, 1968, Ser. No. 752,932
Int. Cl. G01n *1/00*
U.S. Cl. 73—17 **8 Claims**

This invention relates to apparatus for determining the softening point of a solid, such as electrode binder pitch or the

like. This apparatus for determining the softening point of a solid sample has a first heating means and a second heating means, each for containing a solid sample and for heating the solid sample to its softening point at a predetermined uniform rate of temperature rise and having sensing means for continuously measuring the temperature within the first heating means and the second heating means during the heating of the solid sample. Switch gear means are connected to



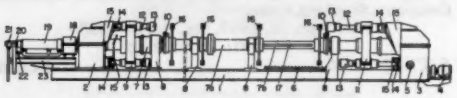
the first heating means and the second heating means to alternately connect the first heating means and then the second heating means to the apparatus. Temperature control means are connected to the switch gear means for controlling the uniform rate of temperature rise in the first heating means and in the second heating means, and temperature recording means are connected to the temperature control means and the switch gear means for recording the temperature rise in the solid sample and the softening point of the solid sample.

3,587,294

ROTARY TUBE-TESTING PRESSES

Erwin Kost, Osterrath, Germany, assignor to Schloemann Aktiengesellschaft, Dusseldorf, Germany

Filed Mar. 25, 1969, Ser. No. 810,203
Claims priority, application Germany, Apr. 9, 1968, P 17 73 160.1
Int. Cl. G01n *3/12*
U.S. Cl. 73—49.5 **4 Claims**



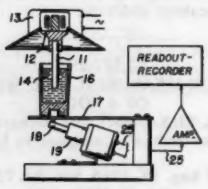
A tube-testing press having a main driving shaft journaled at one end in a stationary bolster and at the other end in an axially movable bolster, with testing-head carriers secured thereon, and a number of testing heads displaceable over stationary cams, and symmetrically arranged around the driving shaft and rotating about the latter, with sealing and clamping devices located in the pipe-testing heads. A pressure-raiser with a differential piston-and-cylinder unit in the main driving shaft provides high-pressure liquid for one cylinder space, the other cylinder space being in communication with a source of low pressure, for returning the piston.

3,587,295

COAGULATION AND VISCOSITY TEST APPARATUS AND METHOD

Sanford L. Simons, Box 78, Star Route, Morrison, Colo.

Filed Mar. 13, 1969, Ser. No. 807,011
Int. Cl. G01n *29/02, 33/16, 11/00*
U.S. Cl. 73—64.1 **8 Claims**



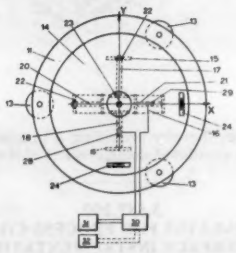
Apparatus and method for determining the coagulation and/or viscosity characteristics of fluids in which a sample of a biological or other fluid is mechanically agitated and the energy transmitted by said fluid is received and evaluated by energy sensitive means to determine the instantaneous and/or sequential energy being transmitted. A readout indicative of fluid viscosity and developing coagulation is obtained that may be coordinated with expired time. A transponder derived vibrational input and a transducer readout is disclosed.

3,587,296

APPARATUS TO DETERMINE THE OUT OF BALANCE MOMENT OF AN OBJECT

Lawrence Brian Povoas, Somerset, England, assignor to British Hovercraft Corporation, Ltd., Yeovil, Somerset, England

Filed Nov. 21, 1968, Ser. No. 777,647
Claims priority, application Great Britain, Dec. 18, 1967, 57340/67
Int. Cl. G01m *1/12*
U.S. Cl. 73—65 **12 Claims**



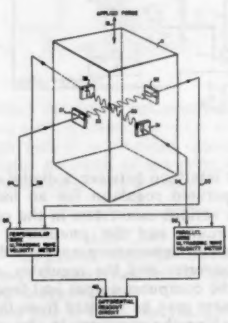
An out of balance device incorporates a first platform which is adjustable relative to a horizontal plane and which supports above it a second platform by a gimbal device having orthogonal axes. Turning of the gimbal device about its axes is limited by a torsion device, and a measuring device measures the limiting torque load exerted by the torsion device. The second platform includes a leveling indicator.

3,587,297

APPARATUS FOR PRECISE STRESS MEASUREMENT

Erwin W. Kammer, McLean, Va., assignor to the United States of America as represented by the Secretary of the Navy

Filed Sept. 25, 1968, Ser. No. 762,471
Int. Cl. G01n *24/00*
U.S. Cl. 73—67.6 **1 Claim**



Apparatus for precise stress measurement which includes the simultaneous transmission of two ultrasonic waves into an isotropic polycrystalline medium in a direction normal to the direction of the stress field applied thereto. One of the waves is polarized parallel to the direction of the stress field so that increasing stresses cause a decrease in the ultrasonic wave velocity within the medium, and the other is polarized perpendicular to the stress field so that increasing stresses cause

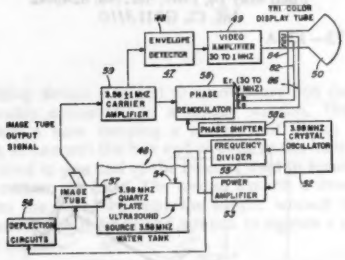
an increase in the ultrasonic wave velocity within the medium. The wave velocities of the two signals are differentially compared to thereby provide precise measurement of the applied stress independent of temperature variations.

3,587,298

ULTRASONIC IMAGE COLOR DISPLAY SYSTEM

John E. Jacobs, Evanston, Ill., assignor to Northwestern University, Evanston, Ill.

Filed Jan. 2, 1969, Ser. No. 788,467
Int. Cl. G01m 9/24
U.S. Cl. 73—67.6 10 Claims



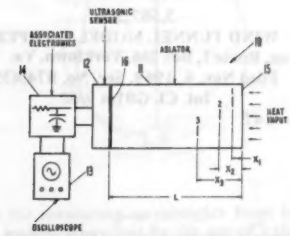
An ultrasonic testing system includes a transmitting transducer for beaming sonic energy through a tank filled with a coupling medium to a receiving transducer. The received sonic energy is converted into an electrical signal which is then phase demodulated into three parts according to the phase of the received sonic energy. Each of these three parts is applied to a separate color related input terminal of a color TV receiver. Hence, the image on the picture tube is displayed in color according to the phase of the received signal.

3,587,299

MEANS AND METHOD FOR SENSING CHAR LAYERS

James J. Foley, Westboro, Mass., assignor to Whittaker Corporation, Los Angeles, Calif.

Filed Feb. 16, 1967, Ser. No. 616,662
Int. Cl. G01n 17/00
U.S. Cl. 73—67.7 9 Claims



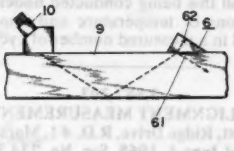
A means and method for char rate detection in ablative materials are provided. In accordance with the invention, sound wave reflectors are embedded at predetermined depths between two opposing surfaces of virgin ablative material. A sound generator is positioned adjacent one surface to send ultrasonic sound waves toward the second surface which is exposed to charring conditions. The generator is coupled with a sensor and senses return of sound waves so that the depth of char and rate of char can be determined, since as the char front moves past each reflector, the resulting layer of porous, charred ablative material prevents reflection of sound waves from reflectors lying beyond the char front in the charred layer of the material.

3,587,300

BACK REFLECTION BLOCK FOR ULTRASONIC FLAW DETECTION

Takashi Fuji, and Matsuo Sato, Yokohamashi, Japan, assignor to Nippon Kokan Kabushiki, Kaisha, Tokyo, Japan

Filed Mar. 28, 1968, Ser. No. 716,757
Claims priority, application Japan, Mar. 28, 1967, 19013/67
Int. Cl. G01n 29/04
U.S. Cl. 73—67.7 7 Claims



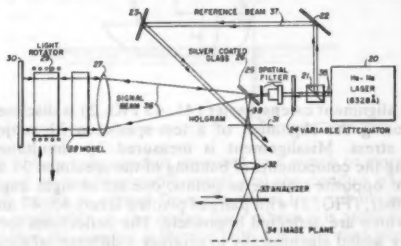
An ultrasonic back reflection block having an entry surface receiving an ultrasonic wave from a surface of a material being tested, and a back surface reflecting the ultrasonic wave in substantially the same direction as it is received from the entry surface. To check resolving power of the equipment, an "artificial flaw" is provided in the block, such as by forming a groove or the like in the back surface, to change the reflection characteristics of the block.

3,587,301

HOLOGRAPHIC INTERFEROMETER FOR ISOPACHIC STRESS ANALYSIS

Henry H. M. Chau, Livermore, Calif., assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed Dec. 19, 1968, Ser. No. 785,173
Int. Cl. G01l 1/24
U.S. Cl. 73—88 10 Claims



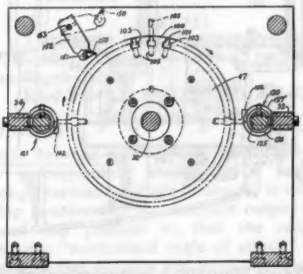
A holographic method and apparatus for real-time isopachic (equal optical path) stress analysis of specimen materials having photoelastic stress-optic properties for structural analysis of stressed structures and shapes. The novel holographic interferometer provides a means of detecting and measuring stress zones inside a structure or shape.

3,587,302

APPARATUS AND METHOD FOR TESTING ELASTOMERIC COMPOSITIONS FOR THEIR CRACK RESISTANCE

Rodney Ta-Chuan Wu, Morristown, N.J., assignor to Texas-U.S. Chemical Company, Parsippany, N.J.

Filed Feb. 19, 1969, Ser. No. 800,587
Int. Cl. G01n 3/54
U.S. Cl. 73—100 6 Claims



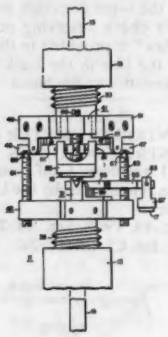
A flex testing machine for elastomeric compositions pro-

vides for the simultaneous testing of a large number of individual samples in a unit, by subjecting them to a number of pure flex stresses, the specimens under test all being mounted on the circumference of a specimen carrier rotated at a controlled but variable rate of speed for a predetermined period of time or number of revolutions, thereby subjecting each of the specimens to a predetermined number of flexes by causing it to contact in each revolution at least one deflector bar, at which the contact is of a nature which induces pure flex in the specimens, all this being conducted under controlled but variable conditions of temperature and atmosphere within the machine and in a measured number of cycles.

3,587,303
ALIGNMENT MEASUREMENT

Robert B. Corbett, Ridge Drive, R.D. #1, Mars, Pa. 16046

Filed June 4, 1968, Ser. No. 734,374
Int. Cl. G01n 3/06
U.S. Cl. 73—103 6 Claims

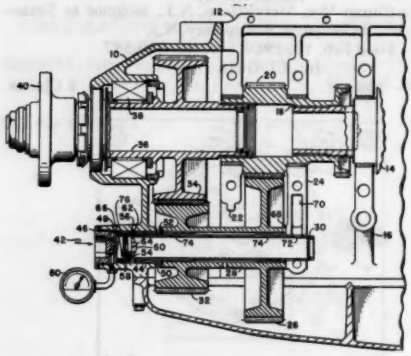


An alignment extensometer (41, 43 FIG. 2) is disclosed for measuring the alignment of a test specimen 31 subject to axial stress. Misalignment is measured by simultaneously sensing the components of bending of the specimen 31 at two sets of opposite transverse points, one set at right angles to the other, (FIG. 3) with pairs of pivoted levers 45, 47 and 53, 55) which are deflected oppositely. The deflections for each set are added algebraically to produce a differential measurement of the bending.

3,587,304
TORQUE-INDICATING DEVICE

John W. Eckart, King, Ontario, Canada, assignor to Avco Corporation, Williamsport, Pa.

Filed Feb. 28, 1969, Ser. No. 803,349
Int. Cl. G01l 5/12
U.S. Cl. 73—136 7 Claims

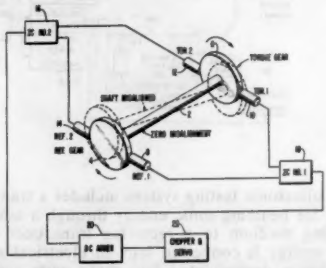


The disclosure illustrates a torque-indicating device of the type that uses axial reaction force on one of a pair of intermeshing helical gears in an output gear box of an engine to determine the engine's torque output. Lubricating fluid in a chamber is subjected to the axial reaction force and its pressure reflects torque. An important feature of the invention is that the chamber is automatically replenished from the engine lubricating system during certain conditions of operation.

3,587,305
TWO-GEAR, MISALIGNMENT COMPENSATED TORQUE SYSTEM

James R. Parkinson, Vergennes, and Robert W. Gamache, Middlebury, Vt., assignor to Simmonds Precision Products, Inc., Tarrytown, N.Y.

Filed May 14, 1969, Ser. No. 824,442
Int. Cl. G01l 3/10
U.S. Cl. 73—136A 2 Claims

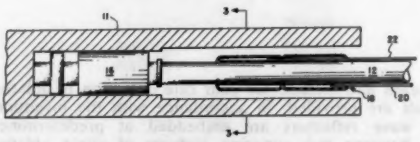


In a phase displacement torque measuring system utilizing a pair of exciter wheels mounted in spaced relationship on a shaft and having a pair of transducers mounted adjacent each wheel for generating alternating signals having a phase displacement indicative of the torsional deflection of the shaft. Compensation for shaft misalignment is achieved by arranging the transducers for each exciter wheel 180° apart such that any misalignment in the shaft provides electrical phase shifts of equal and opposite magnitude in the aligned transducers for the two exciter wheels.

3,587,306
WIND TUNNEL MODEL DAMPER

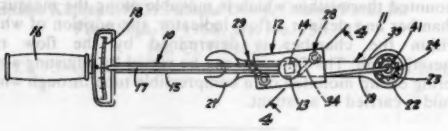
Max B. Bryan, Route 1, Box 266, Yorktown, Va.

Filed Nov. 6, 1969, Ser. No. 874,435
Int. Cl. G01m 9/00
U.S. Cl. 73—147 11 Claims



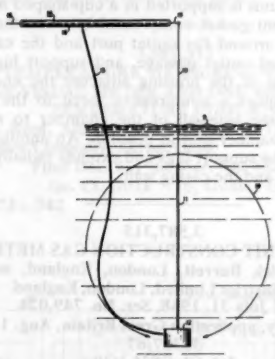
A damper system for alleviating air flow shock loads on a wind tunnel model during the starting and shutdown phases of a wind tunnel where unsteady flow normally exists leading to large, unsteady model loads and possible damage to the model and test balances on the model.

3,587,307
TORQUE WRENCH ADAPTER
Allen E. Newberg, Route 3, Box 374, St. James, Minn.
Filed Dec. 5, 1969, Ser. No. 882,635
Int. Cl. G01l 5/24
U.S. Cl. 73—139 10 Claims



A holding device clamped to an ordinary box end wrench and drivably connected to a torque wrench. The holding device has a base carrying a plurality of clamp members operable to connect the box end wrench to the base. A gauge rod, secured to one end of the base, is used to locate the box end wrench on the base. The torque wrench is drivably connected to the base, whereby the torque wrench is used in combination with the box end wrench to tighten a nut with a selected torque.

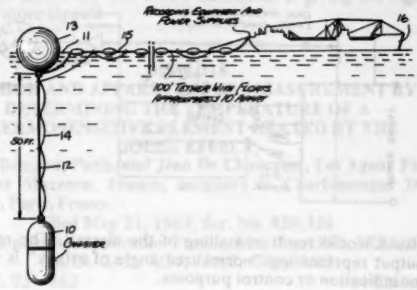
3,587,308
WATER WAVE MONITOR
James W. Tucker, Falls Church, Va., and Thomas H. Cosden, Lothian, Md., assignors to United States of America as represented by the Secretary of the Navy
Filed May 5, 1969, Ser. No. 821,750
Int. Cl. G01f
U.S. Cl. 73—170 6 Claims



A device for measuring waveheights from less than one-tenth of an inch to many feet by the use of a single thin wire probe. Waveheight is determined by the conductance between the thin wire and the body of water which is proportional to the length of wire immersed and therefore to the instantaneous waveheight.

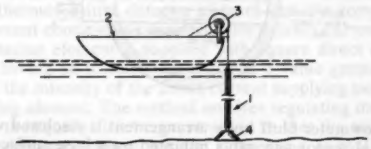
3,587,309
AERO-HYDRO INTERFACE MEASURING SYSTEM
Robert E. Jasperson, Annapolis, Md., assignor to Trident Engineering Associates, Inc., Annapolis, Md.
Filed June 12, 1969, Ser. No. 832,579
Int. Cl. G01c 13/00
U.S. Cl. 73—170 8 Claims

A wave measuring system in which an accelerometer sensor is sealed within a canister suspended by a long lead well below the surface of the sea from a flotation buoy, whereby perturbation of the buoy by wave action is transferred to the



canister to produce accelerometer readings which are a function of wave activity.

3,587,310
HOLLOW CORE INSTRUMENT CABLE
Daniel N. Brown, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy
Filed Oct. 29, 1969, Ser. No. 872,267
Int. Cl. G01d 1/00
U.S. Cl. 73—170A 4 Claims

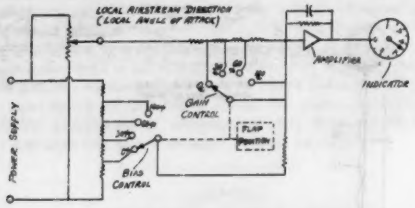


A hollow core conduit is wound on a winch or storage reel aboard an oceanographic vessel and the conduit is of sufficient length to extend from the vessel to a submerged position preferably on the ocean floor where it is anchored. The fact that the conduit is formed with a hollow core permits an oceanographic instrument, such as a bathythermograph probe, to be run up and down the conduit when the conduit is disposed in a vertical disposition between the reel and the ocean floor. Temperature sensing thus can be achieved for all depths and the sensed data transmitted by a telemetering line which supports the probe to a recorder or other apparatus aboard the vessel. The conduit itself includes a flexible and porous exterior casing member formed of a braided ropelike material and a coil spring elastically engaging the interior wall of the casing member throughout its length to provide bulkhead strength sufficient to maintain the hollow core shape of the conduit over a desired range of conduit loads. The braided casing member is used to couple the ends of the conduit to the reel and the anchor so that the entire tensile load is borne by this casing with the interior spring relatively free to move.

3,587,311
AIRCRAFT INSTRUMENT SYSTEM
Robert F. Hays, Jr., Charlottesville, Va., assignor to Teledyne, Inc., Los Angeles, Calif.
Filed June 19, 1969, Ser. No. 834,838
Int. Cl. G01c 21/00
U.S. Cl. 73—180 7 Claims

The ratio between a change in local airstream direction and the corresponding change in a resultant output representing "normalized angle of attack" is varied as a function of flap position and the resultant output is biased as a function of flap position so that the resultant output represents zero "normalized angle of attack" whenever the combination of flap position and local airstream direction is such that the aerodynamic lift is zero and so that the

resultant output represents 100 percent "normalized angle of attack" whenever the combination of flap position and local airstream direction is such that a further increase in angle of



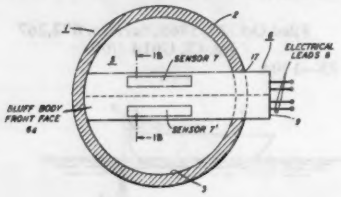
attack would result in stalling of the aircraft. The resultant output representing "normalized angle of attack" is utilized for indication or control purposes.

3,587,312

DIFFERENTIAL SENSOR BLUFF BODY FLOWMETER

Charles L. McMurtrie, North Plainfield, and Alan E. Rodely, Scotch Plains, N.J., assignor to Eastech, Inc., Watchung, N.J.

Filed Dec. 24, 1968, Ser. No. 786,615
Int. Cl. G01p *5/10, 5/00*
U.S. Cl. 73—204 **9 Claims**



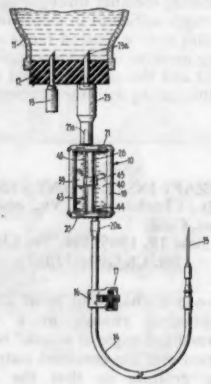
A flowmeter bluff body arrangement is disclosed with differential sensor apparatus mounted on a base surface of the body which faces an incoming fluid flow. Electrically heated sensors are provided with ceramic materials which isolate heatable grid elements from physical contact with the fluid. Circuitry is disclosed for translating sensed oscillatory flow signals into indications of flow rate through a pipeline.

3,587,313

FLOW METER FOR PARENTERAL SOLUTIONS

Bob L. Smith, Santa Cruz, Calif., assignor to I. V. Ometer, Inc., Santa Cruz, Calif.

Filed Jan. 30, 1969, Ser. No. 795,170
Int. Cl. G01p *5/00*
U.S. Cl. 73—209 **9 Claims**



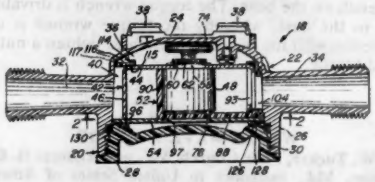
A flow meter for measuring the rate of intravenous infusion of parenteral solutions. The flow meter includes a plurality of chambers interconnected one with another in a series relationship such that a solution flows downwardly from a container supplying the same into and through a drip chamber and upwardly therefrom through a measuring chamber for delivery to a patient. The drip chamber enables the solution delivered thereto to be counted drop by drop, and it has a restricted volume adjacent its lower end enabling such end of the chamber to fill quickly. The measuring chamber has a generally logarithmic curvature from end to end thereof cooperative with a ball-shaped restrictor mounted therewithin which is movable along the measuring chamber and defines a flow indicator, the position of which within the chamber is determined by the flow rate therethrough. The flow rate can be varied by adjusting a metering clamp mounted on a compressible tube through which fluid is carried to a patient.

3,587,314

METERING APPARATUS

Donald J. Kullmann, Fox Point, Wis., assignor to Badger Meter Manufacturing Company, Milwaukee, Wis.

Filed Aug. 30, 1967, Ser. No. 664,442
Int. Cl. G01p *5/00*
U.S. Cl. 73—252 **22 Claims**



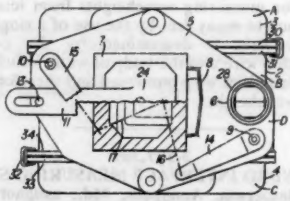
An oscillating piston-type fluid meter including a measuring chamber formed of a thin walled stamped and drawn metal housing, with a piston of a height equal to the internal height of the chamber wall, center hub, output drive and division plate means mounted on the housing, and a flat plate cover over the end of the housing and the piston. The measuring chamber unit is supported in a cup-shaped meter casing with a resilient gasket compressed between the sidewall of the chamber around the outlet port and the casing wall around an aligned outlet passage, and support lugs engage the opposite side of the housing adjacent the end wall. A resilient ring applies a compressive force to the cover in alignment with the sidewall of the chamber to retain the cover and the chamber unit in position. An annular strainer is mounted on the support lugs and extends radially between the housing wall and the casing wall.

3,587,315

SMALL UNIT CONSTRUCTION GAS METERS

Kenneth Frederick Burrett, London, England, assignor to United Gas Industries Limited, London, England

Filed July 31, 1968, Ser. No. 749,024
Claims priority, application Great Britain, Aug. 1, 1967, 35357/67
Int. Cl. G01f *3/20*
U.S. Cl. 73—268 **12 Claims**



The specification discloses a multichamber gas meter having gas flow to and from the chambers controlled by a single slide valve which executes an oscillatory combined rotational and translational movement. A further aspect of the disclosure also relates to a gas meter body having two open cham-

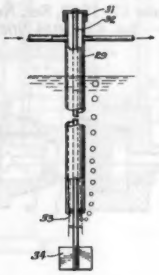
bers and formed as a two part moulded construction, the chambers being closed by diaphragms clamped to the body by covers defining the remaining chambers of the meter. The two parts of the body may be formed by moulding using dies converging from three directions, two of which directions are collinear.

3,587,316

BUBBLE PIPE ATTACHMENT

Bastiaan Kapteyn, 8731 Paloma Drive, Orland Park, Ill.

Filed Sept. 3, 1968, Ser. No. 756,827
Int. Cl. G01f 2/16
U.S. Cl. 73—302 6 Claims



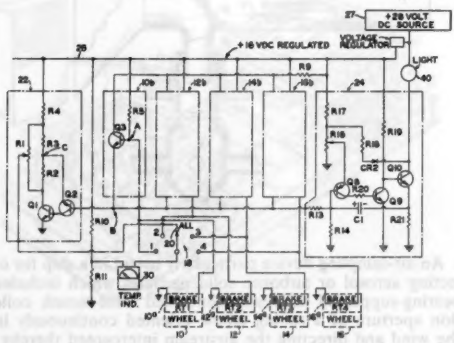
The liquid level in a tank is determined by suspending an air bubble pipe in the liquid and the pressure on the air is measured as the air bubbles emerge from the lower open end of the pipe. The open end of the pipe is kept open by providing a wiping rod within the pipe. The rod protrudes from the open end of the bubble pipe and blades are attached to the protruding end of the rod. The blades are engageable with the surrounding liquid currents, thus moving the rod and wiping the lower margin of the bubble pipe.

3,587,317

BRAKE TEMPERATURE MEASURING SYSTEM HAVING ONE VISUAL METER AND ONE VISUAL HIGH TEMPERATURE INDICATOR

Edgar J. Ruof, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 9, 1968, Ser. No. 782,314
Int. Cl. G01k 7/16; G08b 17/06
U.S. Cl. 73—342 5 Claims



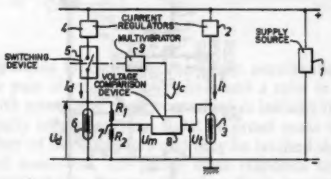
The invention relates to a brake temperature indication system which connects a plurality of thermal indicating transducers through amplifiers to a common outlet point, amplifies the signal received at the common outlet point which is as high as the highest indicating transducer. A light control circuit is driven by the amplified signal from the common outlet point with positive on and positive off characteristics to prevent dimming and flickering. A visual meter is also provided to selectively test which transducer is giving the high-temperature signal.

3,587,318

METHOD AND APPARATUS FOR MEASUREMENT BY DETERMINING THE TEMPERATURE OF A THERMOSENSITIVE ELEMENT HEATED BY THE JOULE EFFECT

Pierre Belugou, Paris, and Jean De Chaumont, Les Ageux Par Pont-Ste Maxence, France, assignors to Charbonnages De France, Paris, France

Filed May 21, 1969, Ser. No. 826,326
Claims priority, application France, May 21, 1968, 152,665
Int. Cl. G01k 7/24, 13/02; G01p 5/12
U.S. Cl. 73—362 14 Claims



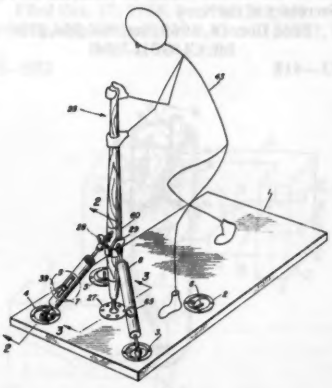
Method and apparatus for measurement by determining the temperature of a thermosensitive element heated by the Joule effect utilizing a compensating thermosensitive element and a thermosensitive detector element with the compensating element continuously supplied with a direct current while the detector element is supplied with square direct current waves having an intensity regulated to a value greater than that of the intensity of the direct current supplying said compensating element. The method involves regulating the duration of the square direct current waves so that the resistance of the detector element has the same value as that of the compensating element whereby the value of one of the variable characteristics of the square direct current waves may be taken as the representative value of the characteristic quantity to be measured.

3,587,319

EXERCISING APPARATUS

William J. Andrews, 9633 Parkwood Drive, Bethesda, Md.

Filed Sept. 30, 1969, Ser. No. 862,179
Int. Cl. A63b 21/00; G01l 5/02
U.S. Cl. 73—379R 7 Claims



An exercising device having a universally mounted gripping pole attached to one or more dampers for resisting

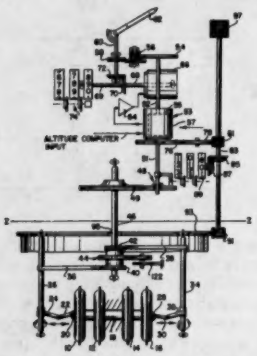
any movement about its universal mounting. The dampers contain a viscous fluid within either opposed reciprocating expansible chambers or opposed rotary expansible chambers and are mounted between a support on either the same side or opposite side of the universal mounting with respect to the gripping area of the pole. Expended power is indicated by a thermometer showing the temperature of the damper fluid.

3,587,320

ALTIMETER INDICATING MECHANISM INCORPORATING FLEXIBLE ROTARY COUPLING

Graham A. Ireland, Ottawa, Ontario, Canada, and Douglas L. McNaughton, Almonte, Ontario, Canada, assignors to Leigh Instrument Limited

Filed July 7, 1969, Ser. No. 839,490
Int. Cl. G01l 7/12
U.S. Cl. 73—386 **5 Claims**



A flexible rotary coupling for circumferentially aligning two shafts while permitting circumferential displacement if the two shafts are independently driven, having coaxial cranks one on each shaft and coaxial spring-loaded crank alignment elements urging the cranks into circumferential alignment but permitting circumferential misalignment against the spring force.

An altimeter with permanent connection of a barometric input through a flexible rotary coupling to the indicating mechanism while permitting the indicating mechanism to be independently directly driven by an altitude computer input.

3,587,321

GLASS PRESSURE MEASURING APPARATUS

Dean H. Couch, and George W. Burdette, China Lake, Calif., assignors to the United States of America as represented by the Secretary of the Navy

Filed Dec. 18, 1969, Ser. No. 886,229
Int. Cl. G01l 7/04
U.S. Cl. 73—418 **4 Claims**

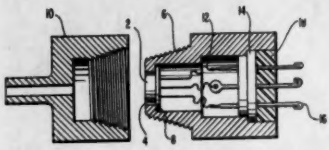
An all glass pressure measuring device for indicating pressure buildup of certain materials under predetermined environmental conditions which comprises a closed glass sample cylinder having a Bourdon gauge and a fill tube sealed to the top thereof. A glass housing open at one end is sealed to the top so as to surround said fill tube and Bourdon gauge. A small mirror is attached to the closed end of the Bourdon tube gauge and another mirror is attached to the outside of the housing which acts as a reference mirror. A change in pressure causes the mirror on the Bourdon gauge to flash a beam of light which is recorded from a scale on a measuring apparatus.

3,587,322

PRESSURE TRANSDUCER MOUNTING

Stephen L. Lobdell, Springfield, Vt., and Ralph S. Gamble, Chester, Vt., assignors to Simmonds Precision Products, Inc., Tarrytown, N.Y.

Filed June 17, 1969, Ser. No. 834,112
Int. Cl. G01l 7/08
U.S. Cl. 73—420 **4 Claims**



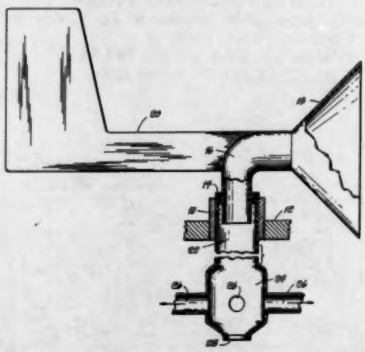
A mechanical mounting package for a pressure transducer utilizing a pressuretight housing for enclosing a transducer and exposing only its torquing surface. The transducer is supported such that it is mechanically isolated from environmental effects.

3,587,323

WIND DIRECTIONAL AIR SAMPLING DEVICE

Morris A. Benjaminson, 626 Riverside Drive, New York City; Nicholas M. Satriano, 6410 Fitchett St., Rego Park, and Irwin J. Katz, 1199 E. 53rd. St., Brooklyn, N.Y.

Filed Aug. 18, 1969, Ser. No. 850,738
Int. Cl. G01n 1/22
U.S. Cl. 73—421.5 **1 Claim**



An air-sampling device particularly useful in a ship for collecting aerosol or airborne solid particles which includes a bearing-supported aerovane controlled wide-mouth collection aperture of a tubing elbow oriented continuously into the wind and directing the airstream intercepted thereby to pneumatic conduit terminating in a chamber having lateral air exhausts and a removable specimen collection dish in the path of the air issuing from the conduit.

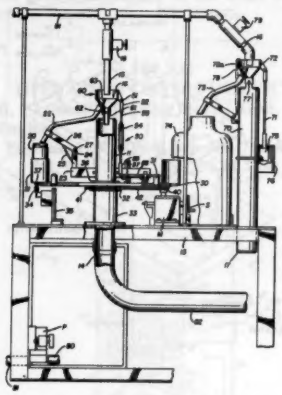
The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

3,587,324

SAMPLING DEVICE

William J. Bandy, Jr., and Robert L. Sell, Akron, Ohio, assignors to Karl R. Rohrer Associates, Akron, Ohio

Filed Feb. 14, 1969, Ser. No. 799,420
Int. Cl. G01n 1/10
U.S. Cl. 73—423 7 Claims



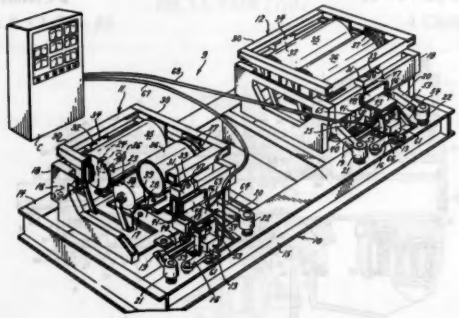
A sampling device adapted to take predetermined amounts of liquid from a conduit for testing purposes. The sampler will automatically take, at set time intervals, an individual sample from the flow and is also adapted to take a composite sample proportionate to the total flow with this second sample being taken in response to the volume of flow through the conduit.

3,587,325

CONTROL FOR DYNAMIC WHEEL ALIGNNMENT APPARATUS

Lee Hunter, St. Louis, and David A. Senften, Florissant, Mo., assignors to Hunter Engineering Company, Bridgeton, Mo.

Filed July 7, 1969, Ser. No. 814,059
Int. Cl. G01m 1/22
U.S. Cl. 73—462 9 Claims



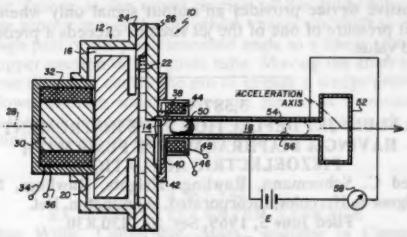
Control means in the nature of a brake which can be applied or activated in response to unstable motion of dynamic vehicle wheel alignment apparatus. The control means is constantly vigilant in monitoring the motion of such apparatus so that a vehicle which is greatly out of alignment is prevented from causing the dynamic apparatus to vibrate or gyrate in an unstable and dangerous manner.

3,587,326

ACCELERATION SENSING APPARATUS

Hugh E. Riordan, Wyckoff; Bernard Parker, Teaneck, N.J., and Leon Weisbord, New York, N.Y., assignor to Singer-General Precision, Inc., Little Falls, Tex.

Filed Apr. 24, 1968, Ser. No. 723,767
Int. Cl. G01p 15/04, 15/08
U.S. Cl. 73—492 11 Claims



An apparatus for detecting maximum accelerations and including a pair of adjacent chambers and a tube in communication with one of the chambers which is initially filled with a substantially incompressible fluid. A proof mass is disposed in the other of the chambers and may be latched there. In the unlatched condition, the proof mass responds to accelerations to project into the one chamber. Such projection forces displaced liquid from the one chamber into the tube past a check valve allowing such flow. The tube contains a metallic bead which is pushed by the fluid flowing in the tube and thus, the position of the bead along the tube depends on the amount of fluid displaced. The check valve prevents reverse flow of fluid and the bead is held in its maximum displacement position.

For detecting the position of the bead along the tube, the tube interior has a resistive element and a conductive element, each extending axially along the tube and being insulated from each other except by the movable bead. An effective potentiometer is thus formed which, with external connections, energization and detecting means can determine the position of the bead and, therefore, also the acceleration.

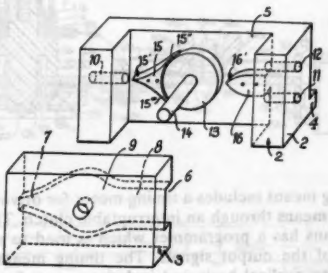
To hold the bead firmly against the liquid, the end of the tube remote from the check valve, communicates with a closed chamber containing a gas under sufficient pressure to force the bead along the tube.

3,587,327

ANGULAR VELOCITY MEASURING AND DIRECTION INDICATING APPARATUS

Jean Pierre Desthuilliers, Chelles, France, assignor to Compagnie Des Freins Et Signaux Westinghouse, Freinville-Sevran, France

Filed Oct. 17, 1968, Ser. No. 768,310
Claims priority, application France, Oct. 27, 1967, 126252
Int. Cl. G01p 3/26
U.S. Cl. 73—502 4 Claims



Angular velocity measuring and direction indicating apparatus in which a single fluid jet stream is divided into two

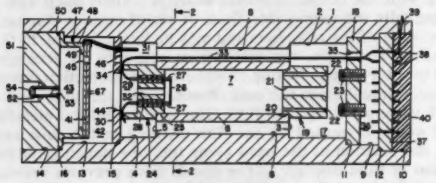
jet streams each flowing in substantially tangential contact with opposite sides of a disc fixed on an axially rotating shaft which imparts to the jet streams a pressure differential having a magnitude proportional to the rotational velocity of the shaft, and imparts to one or the other of the jet streams the higher relative pressure depending upon the direction of shaft rotation. In one embodiment, a proportional amplifier device connected across the two jet streams operates a differential pressure gauge to provide indications of speed and direction. In another embodiment, a threshold pressure responsive device provides an output signal only when the output pressure of one of the jet streams exceeds a predetermined value.

3,587,328

A FLUID-JET DEFLECTION TYPE INSTRUMENT HAVING A DIAPHRAGM TYPE PUMP WITH PIEZOELECTRIC ACTUATION

Wilfred C. Schuemann, Rawlings Heights, Rawlings, Md., assignor to Hercules, Incorporated, Wilmington, Del.

Filed June 5, 1969, Ser. No. 830,830
Int. Cl. G01p *15/00*
U.S. Cl. 73—516 **8 Claims**



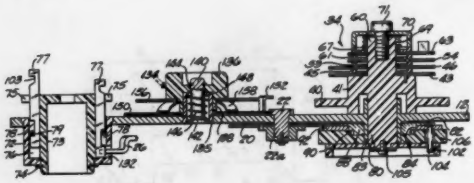
A fluid jet deflection type instrument for sensing motion having a pump comprising a pair of laminated piezoelectric elements energized to expand and/or contract alternately so that the elements vibrate in the nature of a diaphragm pump, the elements having a pump orifice aligned across an intake chamber with an outlet orifice, whereby fluid is drawn through the pump orifice when the elements move to increase the volume of the pump chamber and a charge of fluid is expelled through the pump orifice and carries across the inlet chamber through the outlet orifice when the elements move to decrease the volume of the pump chamber.

3,587,329

TIMING MEANS FOR PROVIDING TIMED OUTPUT SIGNALS

Lambert W. Fleckenstein, 4445 N. 135th St., Brookfield, Wis.

Filed May 6, 1969, Ser. No. 822,185
Int. Cl. F16n *5/76*
U.S. Cl. 74—3.54 **6 Claims**



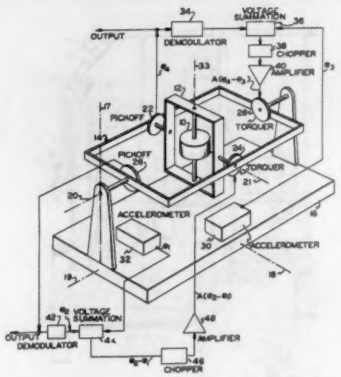
A timing means includes a timing motor for driving an output signal means through an interruptable clutch. The output signal means has a programmer which is used to adjust the duration of the output signals. The timing means may be operated on cyclical basis and includes means for initiating the operation of the timing means at a desired time during the cycle.

3,587,330

VERTICAL REFERENCE SYSTEM

James W. Deer, Portland, Oreg., assignor to Electronic Specialty Company, Portland, Oreg.

Filed Nov. 18, 1968, Ser. No. 776,717
Int. Cl. G01c *19/28;* **G01p** *9/02*
U.S. Cl. 74—5.6 **5 Claims**



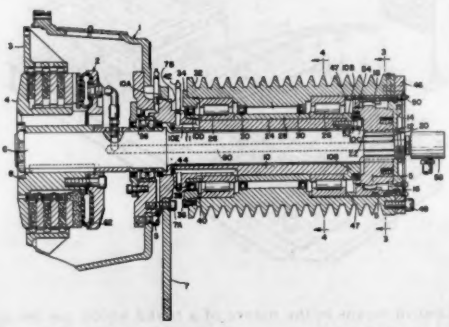
A vertical reference system is provided for supplying output electric signals proportional to the sines of the angles of tilt of a structure with respect to the vertical about two tilt axes at right angles to each other. The specific system disclosed includes a vertical gyroscope having a rotor mounted in inner and outer gimbals on a gyroscope support which in turn is rigidly secured to the structure subject to being tilted. Two force balanced accelerometers are secured to the gyroscope support and each is positioned to sense the angle of tilt of the structure about one of such tilt axes. The accelerometers are employed in conjunction with pickoffs and torquers on the axes of the gimbals to maintain the spin axes of the gyroscope vertical. The output signals are obtained from the pickoffs on the gimbal axes.

3,587,331

POWER TAKEOFF WITH SHAFT FREE OF RADIAL LOAD

Jack W. Moss, Wichita Falls, Tex., assignor to Wichita Clutch Company, Inc., Wichita Falls, Tex.

Filed May 15, 1969, Ser. No. 824,828
Int. Cl. F16h *37/00, 57/02;* **F16d** *3/18*
U.S. Cl. 74—11 **2 Claims**



A power takeoff including an outwardly extending shaft, an elongated rotatable member, such as a sheave supported in journaled relation on the exterior of a housing to prevent a radial load from being transmitted to the shaft thereby to

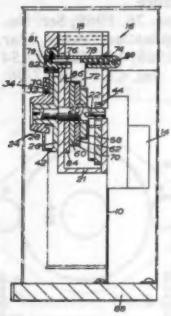
enable a greater torque to be transmitted to an elongated rotatable member, such as a multigroove pulley or a sprocket. Such power takeoff arrangement enables the distal end of the shaft to be coupled in driving relation with the multigroove pulley or sprocket in a universal manner, so as to be relatively free floating and self-aligning, and to transmit torque only. The universal connection embodies internal and external gear members with sufficient clearance, which when in complementary meshed relation, will give necessary clearance for proper alignment of the shaft without binding or misalignment thereof.

3,587,332

OPERATION CONTROL DEVICE

John J. Bell, "Ashleaf", Whalley Road, Read, Burnley, Lancashire, England

Filed Sept. 26, 1968, Ser. No. 762,860
Int. Cl. F16h *25/08;* **B67d** *5/08*
U.S. Cl. 74—54 **10 Claims**



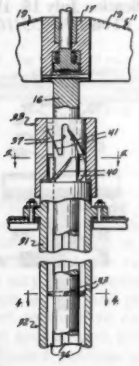
An operational control device for periodic actuation of an aerosol dispenser or other unit comprises mechanism for periodically rocking an operating lever connected to the unit, the mechanism including adjustments for selectively varying both the frequency and time of actuation of the unit.

3,587,333

GLOVE BOX TURNTABLE CAM ROTATING MECHANISM

Richard D. Duncan, 413 Basswood, Richland, Wash., assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed Jan. 9, 1970, Ser. No. 001,675
Int. Cl. F16h *27/02*
U.S. Cl. 74—88 **4 Claims**



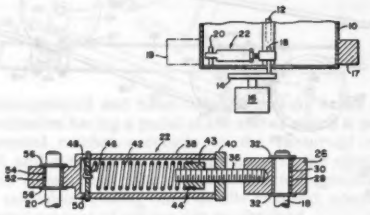
A mechanism for rotating a glove box turntable through a predetermined angle includes a guide tube having upper and lower portions each with a plurality of linear grooves therein. The linear grooves in the lower portion are offset from the linear grooves in the upper portion. Each of the upper and lower portions of the guide tube have a plurality of wedge grooves intersecting the linear grooves in both the upper and lower portions. A shaft, positioned within the guide tube, is connected to the glove box turntable and includes a pin inserted in one of the linear grooves in the lower portion. Moving the shaft along the guide tube causes the pin to move along the linear groove in the lower portion to engage a wedge groove in the upper portion of the guide tube. The wedge groove moves the pin which causes the shaft to rotate through part of the predetermined angle to a linear groove in the upper portion of the guide tube. Moving the shaft in the reverse direction causes the pin to engage a wedge groove in the lower portion which moves the pin so as to rotate the shaft through the remainder of the predetermined angle back to a linear groove in the lower portion.

3,587,334

EXTENSIBLE ECCENTRIC LINKAGE

Gordon Willis, Cambridge, Mass., assignor to Computervision Corporation, Waltham, Mass.

Filed Aug. 18, 1969, Ser. No. 850,737
Int. Cl. F16h *27/02*
U.S. Cl. 74—89 **4 Claims**



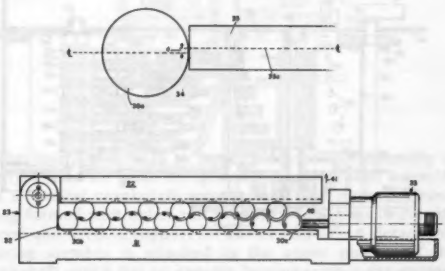
An eccentric linkage assembly includes an extensible link pivoted eccentrically at one end to a rotatable driving member and at its other end to a pivoted member. A fixed position stop is provided adjacent the pivoted member to stop the pivoted member at a point when said link is tensioned so that any overrotation of the driving member merely extends the link to further press the pivoted member against the position stop. In a modified form of the invention, the link is both extensible and contractable so that a second position stop may be provided adjacent the pivoted member to fix its position at a point when the link is subjected to compression so that any overrotation of the driving member at this point merely causes the link to contract to urge the pivoted member against the second stop.

3,587,335

DEVICE FOR PROVIDING PRECISE MOTIONS

Bradford Howland, Cambridge, Mass., assignor to Massasetts Institute of Technology, Cambridge, Mass.

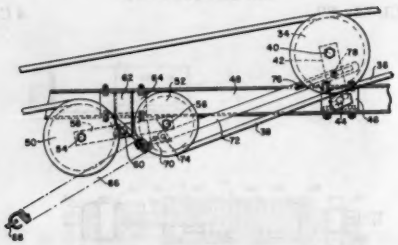
Filed Apr. 10, 1969, Ser. No. 815,038
Int. Cl. F16h *27/02*
U.S. Cl. 74—89.15 **11 Claims**



A tilt table capable of precise angular motion in response to the movement of a micrometer screw is described. The

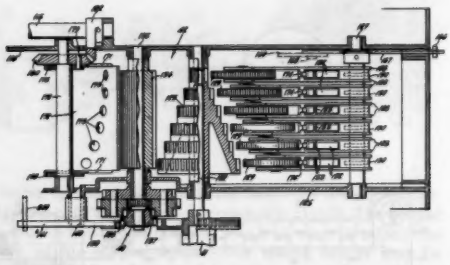
micrometer screw is in contact with an end ball of a juxtaposed multiplicity of spherical balls in opposed "v" shaped races. One end of the races is constrained by a pivot so that the movement apart of the races is angular with respect to each other. At the pivot end, the other end ball of the multiplicity of balls is mechanically constrained from moving along the race. Therefore, the movement of the screw against the ball farthest from the pivot causes the balls to force the races angularly apart. Precision following of the angle with respect to the movement of the micrometer screw is obtained by causing the micrometer screw to impart simultaneous rotational and longitudinal movement of the ball with which it makes contact. This device is modified to produce precise pure lateral motion of a member with respect to another by linking the members and using a plurality of ball races.

3,587,336
BELT DRIVE MECHANISM
Charles Benjamin Peak, Geneseo, Ill., assignor to Deere & Company, Moline, Ill.
Filed Oct. 20, 1969, Ser. No. 867,673
Int. Cl. F16h *7/12*
U.S. Cl. 74—242.11 **8 Claims**



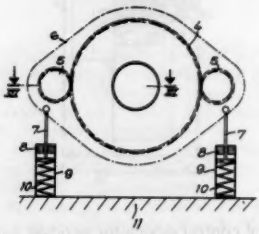
A belt drive mechanism for connecting a driven sheave mounted forwardly on a combine with a straw chopper drive sheave mounted rearwardly thereon, including a first drivebelt connecting the straw chopper drive sheave with an intermediate sheave mounted on a swingable arm forwardly on the combine, and a second drivebelt connecting the intermediate sheave with the driven sheave. A spring-loaded idler device applies tension directly to the first belt and indirectly to the second belt through the swingably mounted intermediate sheave, and a lost-motion connection between the idler device and the swingable arm mounting the intermediate sheave applies tension directly to the second belt when the first belt is removed from the mechanism.

3,587,337
TRANSMISSION FOR MOTOR FUEL DISPENSING APPARATUS
Einar T. Young, Newtown Square, Pa., assignor to Sun Oil Company, Philadelphia, Pa.
Filed Aug. 18, 1969, Ser. No. 850,901
Int. Cl. F16h *5/74, 3/34;* **B67d** *5/00*
U.S. Cl. 74—335 **12 Claims**



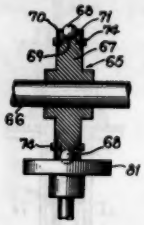
An apparatus for dispensing a selected grade of motor fuel (each grade having a different octane rating) has an array of operating pushbuttons a selected one of which may be actuated (the selection being made according to the grade of fuel desired) to start the dispensing operation. Upon the actuation of a pushbutton, certain instrumentalities in the apparatus are energized or released to (among other things) select gearing in the apparatus appropriate to the grade selected, reset the counter or register to zero, set a control valve to a predetermined position, and start up the pump to cause the dispensing of fuel to begin. All of these functions are performed automatically, i.e., without any further human intervention, once the pushbutton has been actuated. Upon the termination of the actual dispensing, electrical instrumentalities are automatically activated to carry out certain resetting operations, prior to the next dispensing operation. The dispensing apparatus is particularly suitable for a self-service type of operation.

3,587,338
MECHANISM FOR DRIVING ROTARY KILNS
Georges Henriot, Houilles, France, assignor to Engrenages Et Reducteurs (Engrenages Citroen Et Ets Robert Messain Reunis), Paris, France
Filed Mar. 26, 1969, Ser. No. 810,509
Claims priority, application France, Mar. 27, 1968, Dec. 31, 1968, 145,722;182,547
Int. Cl. F16h *57/00*
U.S. Cl. 74—410 **9 Claims**



A mechanism for driving an open-ended rotary kiln or grinder carries a drive gear which meshes with a driving pinion. The latter is in turn driven by an output shaft of a second of two planetary gear trains. The gear trains are coupled through the planet carrier of the first and the drive gear of the second. The gear trains are mounted one one either side of the driving pinion.

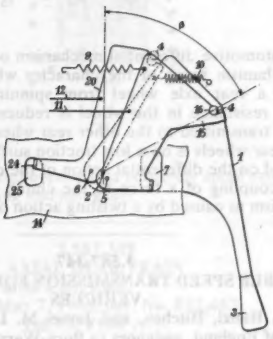
3,587,339
RIGHT-ANGLE DRIVE
Jack J. Gilbert, Suffern, N.Y., assignor to Spyro Dynamics Corporation, Northvale, N.J.
Continuation-in-part of application Ser. No. 749,849, Aug. 2, 1968, now Patent No. 3,537,334, and a continuation-in-part of 749,850, Aug. 2, 1968, now abandoned. This application July 18, 1969, Ser. No. 843,133
Int. Cl. F16h *1/12, 55/10, 37/06*
U.S. Cl. 74—416 **5 Claims**



A right-angle drive comprising a ball-toothed gear having a plurality of universally rotatable spaced balls at its periphery

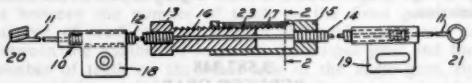
and driven by a rotatable face gear having a spiral groove into which one or more of the balls fit. The drive is applied to the control of the planetary gears in a planetary gear train to provide a continuously variable speed drive which is reversible.

3,587,340
MECHANISM
Albert Grosseau, Chaville, France, Assignor to Societe Anonyme Automobiles Citroen, Paris, France
Filed Jan. 10, 1969, Ser. No. 790,371
Claims priority, application France, Jan. 11, 1968, 135,643
Int. Cl. G05g 1/00
U.S. Cl. 74—469 **7 Claims**



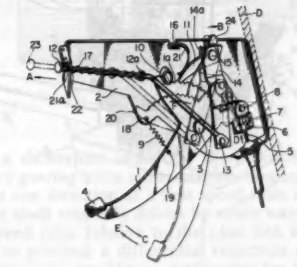
This mechanism for controlling from a single lever a plurality of successive and independent reciprocating movements for performing different functions comprises essentially a control lever fulcrumed about a pivot pin carried by a supporting plate, a driving pin carried by said control lever and adapted to drop into notches constituting radial abutment elements which are provided at the free end of each one of a pair of quadrants fulcrumed on pivot pins disposed on either side of the pivot pin of said control lever, and to escape from said notches at the end of an angular movement of each one of said quadrants, the amplitude of said angular movements being adjustable by adequate stop means.

3,587,341
ACTUATOR CABLE ADJUSTMENT DEVICE
Theodore E. Fiddler, 1268 Suffield Drive, Birmingham, Mich.
Filed Jan. 26, 1970, Ser. No. 5,551
Int. Cl. F16c 1/10; F16l 27/12
U.S. Cl. 74—501 **1 Claim**



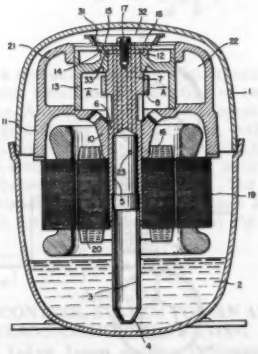
A flexible actuator cable having an outer sheath and a coaxial wire and including an adjustable plug and a split sleeve socket combination integrated in the sheath and surrounding the wire wherein the plug is variably depthwise insertable in the socket to vary the extension of the sheath relative to the wire to adjust tension and pressure between the wire and the sheath and to improve ease and accuracy of operation. The plug and socket have interlocking serrations to secure their axial adjusted position and a cam on either the socket or plug forcibly engageable with the other by relative angular movement to expand the socket to disengage the serrations to permit axial movement between the plug and socket to adjust the extension of the sheath relative to the wire and upon release of cam engagement the socket contracting to reengage the serations to lock the sheath in the adjusted axial extension.

3,587,342
FOOT-OPERATED HAND-RELEASED PARKING BRAKE
Takeo Yamazaki, Kariya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Aichi Prefecture, Japan
Filed July 1, 1969, Ser. No. 838,124
Claims priority, application Japan, July 6, 1968, 43/57540
Int. Cl. G05g 5/06
U.S. Cl. 74—540 **5 Claims**



A foot-operated and hand-released parking brake operating mechanism having a pedal at the end of which is provided a segmental ratchet eccentric to the center of rotation thereof, and a pawl that is spring biased to the ratchet segment for engagement with it to be retracted against the action of said spring pulling out a handle on a rod, whereby any moderated amount of release can be obtained.

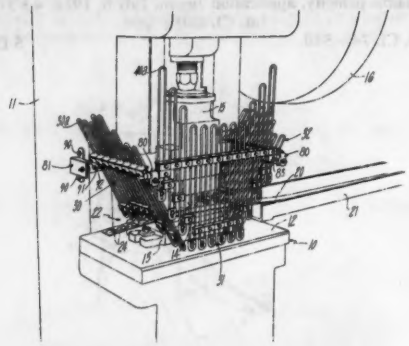
3,587,343
MOTOR-COMPRESSOR
Heinz Mahncke, Sonderborg, and Knud Vagn Valbjorn, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark
Filed June 24, 1969, Ser. No. 836,013
Int. Cl. G04g 3/00
U.S. Cl. 74—603 **5 Claims**



The invention relates to a motor-compressor assembly of the type used for small refrigerating machines. The assembly has a vertical crankshaft arrangement with a carrier frame being formed with radial and axial thrust bearings to provide lateral and vertical support for the crankshaft. A detachable bearing member is attached to the upper portion of the crankshaft which has an annular bearing surface for engagement with said axial thrust bearing and compensating weight

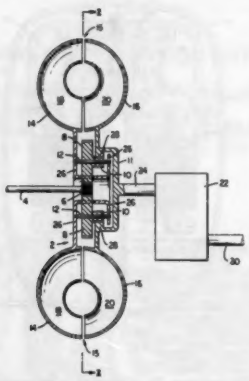
means for counterbalancing the crank portion of the crankshaft.

3,587,344
SAFETY DEVICE
Edwin William Plumb, Linden Road, Woodbury, Conn.
Filed Jan. 30, 1970, Ser. No. 7,033
Int. Cl. F16p *1/00*
U.S. Cl. 74—612 8 Claims



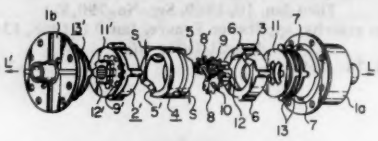
Several U-shaped rods are mounted for longitudinal adjustment on a common lateral support to form a safety barrier for adjustable mounting on a punch press or the like, the adjacent legs of adjacent U-shaped rods being clamped together and the adjacent free ends of each rod being closed by a clamp. Several barriers may be joined to form the desired shape of barrier and the individual rods can be positioned to accommodate tooling and stock flow.

3,587,345
TRANSMISSION
William M. Johnson, 1304 N. Delaware St., Indianapolis, Ind.
Filed Feb. 25, 1969, Ser. No. 802,020
Int. Cl. F16h *47/08, 3/74*
U.S. Cl. 74—688 1 Claim



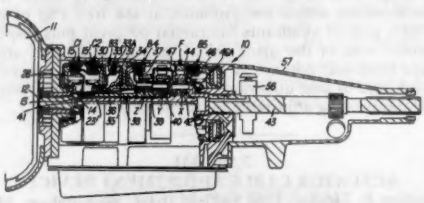
A fluid coupling having a planetary gear system mounted on the inner periphery of the driving element thereof. The planetary gear system includes a sun gear which receives the input. The planetary gears are coupled to a race which is an integral part of the driven element of the fluid coupling.

3,587,346
AUTOMOTIVE DIFFERENTIAL MECHANISM OF LIMITED-SLIP TYPE
Koichi Takahashi, and Nobuteru Hitomi, Yokohama, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan
Filed Apr. 23, 1969, Ser. No. 818,671
Int. Cl. F16h *1/44*
U.S. Cl. 74—710.5 9 Claims



An automotive differential mechanism of limited-slip type, the mechanism being of the character which is adapted to prevent a rear axle wheel from spinning idly when the running resistance in the wheel is reduced with a reduced traction transmitted to the other rear wheel. As soon as one of the rear wheels is on a low traction surface, a limitation is exercised on the differential action of the differential gearing by the coupling of a force to the clutch of the differential mechanism as caused by a twisting action of its center ring.

3,587,347
VARIABLE SPEED TRANSMISSION FOR AUTOMOTIVE VEHICLES
Carl W. Hanzi, Hitchen, and James M. Laing, Letchworth, both of England, assignors to Borg-Warner Limited, Letchworth, Hertfordshire, England
Filed Oct. 10, 1968, Ser. No. 766,427
Claims priority, application Great Britain, Oct. 11, 1967, 46449/67
Int. Cl. F16h *57/10;* B21k *1/30*
U.S. Cl. 74—759 8 Claims

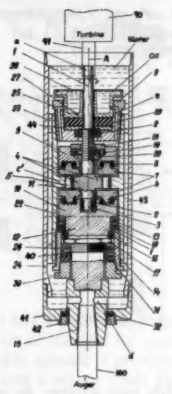


The Specification describes a variable speed hydraulically operated transmission for an automotive vehicle including three epicyclic gear sets. Control of gear change is effected by hydraulically operated brakes and clutches. Most of the components of the brakes and clutches are formed as steel pressings. This reduces the bulk weight and cost of the transmission.

3,587,348
REDUCER GEAR
Constantin Enoiu, and Valeriu Sergiu Popa, both of Bucharest, Romania, assignors to Grupul Industrial Foraj Extractie Titeiu Moinesti, Moinesti, Romania
Filed Feb. 18, 1969, Ser. No. 800,129
Claims priority, application Romania, Feb. 19, 1968, 55922
Int. Cl. F16h *1/28, 13/08;* F21b *3/08*
U.S. Cl. 74—797 10 Claims

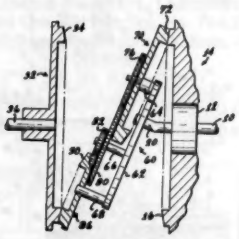
An input shaft **1** is connected to the sun gear **4** of a planetary-gear set whose planet carrier **7, 11** is fixed to an output shaft **12** while an associated ring gear is formed by a stationary housing **22**, the planetary pinions being constituted by rotatable discs **7** bearing independently rotatable rollers **5** which act as teeth by fitting into peripheral recesses *c* of the housing; the teeth of the sun gear are constituted by pointed

cams 4 whose angular spacing or pitch is considerably greater than that of the recesses whereby an increased step-



down ratio is realized even with a relatively small ratio of the pitch radii of the ring and sun gears.

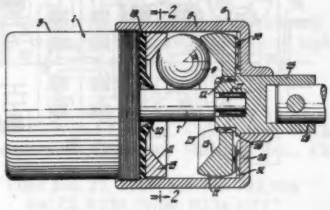
3,587,349
AXIAL GEAR TRAIN
Philip E. Massie, Culver City, Calif.
Filed May 7, 1969, Ser. No. 822,462
Int. Cl. F16h *1/28*
U.S. Cl. 74—800 **3 Claims**



The device is an axial gear train for purposes of effecting a change of speed such as a substantial reduction in speed. There is provided a fixed or nonrotatable bevel gear at the center of which is an input shaft. Axially aligned with the input shaft is an output shaft having a rotatable output bevel gear on it. The input shaft has an axial portion between the two bevel gears which is positioned at an angle, and journaled on this part of the input shaft is a double bevel gear having bevel teeth on both sides so that one side of this gear meshes with the nonrotatable gear and one side meshes with the rotatable output gear. Different relationships are possible as between the number of teeth on the fixed gear, the number of teeth on one side of the angle gear; and as between the number of teeth on the output gear and the number of teeth on the other side of the angle gear. By reason of these relationships high reductions in speed or increases in speed are possible as between the input shaft and the output shaft.

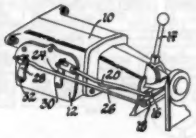
3,587,350
POWER TRANSMISSION INCLUDING FRICTION DRIVE AND GEAR DRIVE
Bert R. Wanlass, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed June 18, 1969, Ser. No. 834,249
Int. Cl. F16h *1/28*
U.S. Cl. 74—800 **19 Claims**

Speed-reducing transmission having a ball driven in an orbital path about the armature shaft of a drive motor at a predetermined speed ratio. The orbiting ball actuates strain-wave-type gearing that further multiplies the speed ratio provided by the ball to drive an output. This transmission may have elastomeric parts which provide for automatic adjustment for wear of the transmission components and which reduce slippage between these parts. A plurality of these transmissions can be readily coupled in series to provide a multistage transmission for producing large reduction ratios.



There is a differential reduction drive possible by having strain-wave gearing drive a transmission housing relative to a support in one direction at a first speed ratio and by having the output shaft rotatably driven by strain-wave gearing at a second speed ratio relative to the case and in an opposite direction to produce a differential reduction drive. One of the embodiments provides a mechanism for unlocking the drive so that the output may freewheel in either direction permitting override manual operation.

3,587,351
TRANSMISSION AND CONTROLS WITH NEUTRAL START SWITCH
Robert C. Keller, Troy, and Leslie K. Walters, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Oct. 24, 1969, Ser. No. 869,197
Int. Cl. B60k *21/00;* **G05q** *5/00;* **F02n** *17/00*
U.S. Cl. 74—850 **10 Claims**

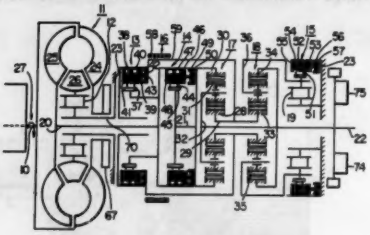


Controls for a manual transmission incorporating an interlock that prevents simultaneous selection of two gear ratios at the same time. A neutral start switch is employed for controlling the engine starter circuit. In one embodiment the start switch is actuated by double lever interlock components and in another embodiment by camming action of locking balls disposed between parallel shift rails. The transmission controls and neutral start switch and controls are supported in a cover plate for the access opening in the transmission housing.

3,587,352
HYDRAULIC CONTROL SYSTEM FOR AN AUTOMATIC TRANSMISSION MECHANISM
Nobutake Ougi, Tokyo, Japan, assignor to Nissan Motor Company, Limited, Kanagawa-ku, Jokohama, Japan
Filed May 6, 1969, Ser. No. 822,171
Claims priority, application Japan, May 13, 1968, 43-31768
Int. Cl. B60k *17/00*
U.S. Cl. 74—868 **5 Claims**

A hydraulic control system for an automatic transmission mechanism for an automotive vehicle to provide a constant shifting limit speed from second to first speed ratio without respect to the accelerator opening and also to enable the

shifting from second to first speed ratio always at the same vehicle speed. This system comprises a 2–1 schedule valve



for changing the drive through the transmission from second to first and a kickdown cutoff valve.

3,587,353

HYDRAULIC CONTROL SYSTEM FOR AN AUTOMATIC TRANSMISSION MECHANISM

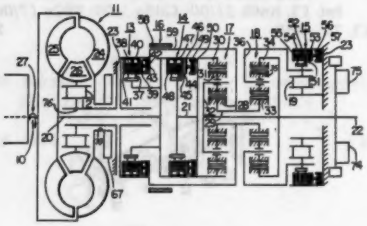
Tetsuya Iijima, Tokyo, Japan, assignor to Nissan Motor Company Ltd., Jokohama, Japan

Filed May 6, 1969, Ser. No. 822,260

Claims priority, application Japan, May 13, 1968, 43/31769

Int. Cl. B60k *17/00*

U.S. Cl. 74—868 **22 Claims**



A hydraulic control system for an automatic transmission mechanism for an automotive vehicle to reduce a shifting time upon manual downshifting by raising line pressure for effecting good engine-braking function. This system comprises a throttle backup valve means for providing high fluid pressure without respect to the low throttle opening in engine, and a backup schedule valve for controlling the operation of the throttle backup valve depending upon the position of the selector valve means.

3,587,354

CHANGE-SPEED CHARACTERISTIC CONTROL APPARATUS IN AUTOMATIC TRANSMISSION APPARATUS FOR VEHICLE

Tomio Oguma, Iruma-Gun; Sadanori Nishimura, Tokyo, and Tadaatsu Satomi, Tokorozawa-shi, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

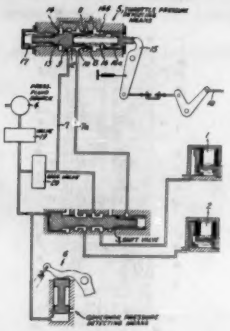
Filed July 28, 1969, Ser. No. 845,324

Claims priority, application Japan, July 31, 1968, 43/53653

Int. Cl. B60k *21/00*; **F16k** *25/00*

U.S. Cl. 74—868 **7 Claims**

A change-speed characteristic control apparatus which includes, for low- and high-speed friction clutches, a shift valve; and, coupled to the shift valve, a throttle pressure detector and a governor detector. The throttle pressure detector is provided with two springs to give a change-speed characteristic with two degrees of slope.



3,587,355

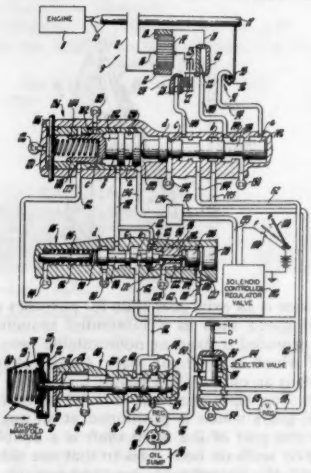
TRANSMISSION AND SHIFT CONTROL SYSTEM

Robert H. Schaefer, R. R. 1, Box 289, Westfield, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 25, 1969, Ser. No. 852,774

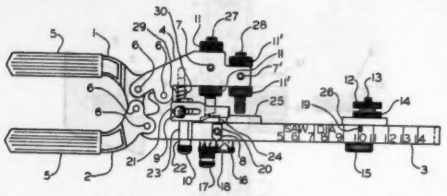
Int. Cl. B60k *19/14*

U.S. Cl. 74—868 **36 Claims**



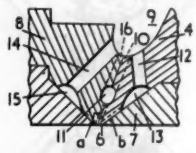
An engine driven multispeed transmission having an automatic shift control system having an automatic shift valve which is spring biased to a downshift position, upshifted in response to a pressure proportional to the output shaft speed and further controlled by two signal pressures proportional to torque demand on the engine to provide upshifts at speed values which gradually increase and downshifts at lower speed values which increase more rapidly as the torque demand increases from low to high values so the difference between the upshift speed and the downshift speed gradually decreases with increasing torque demand to provide an automatic transmission shift control which shifts in response to decreasing changes in speed with increasing torque demand for optimum performance. Manual overcontrols, a throttle actuated detent may provide shifting at output speeds at or slightly higher than the maximum torque demand automatic upshift speed and a manual range selector may provide shifting at a higher output speed than detent shift speed.

3,587,356
SAW SET
Clarence R. Ferguson, Argonia, Kans., and Rubie E. Periman, Owasso, Okla.
Filed Aug. 14, 1969, Ser. No. 850,058
Int. Cl. B23d 63/02
U.S. Cl. 76—64 7 Claims



A saw-setting tool has a pair of opposed jaws hingedly interconnected to a pair of handles for opening and closing of the jaws. An adjustable spindle is provided on the lower jaw for rotatably supporting a rotary blade during location of alternate, successive teeth of the blade for deflection between a plunger and anvil on the jaws. A flexible blade stop on each side of the tool is provided for engaging and indexing the blade during rotation of the latter, and a limit member on the upper jaw abuts the blade during closure of the jaws to insure uniform deflection of each tooth and prevent deformation of the body of the blade.

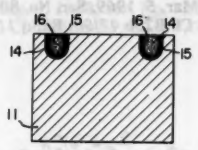
3,587,357
PLASTICS EXTRUSION DIES AND METHOD OF THEIR MANUFACTURE
Frank B. Mercer, Blackburn, England, assignor to Netlon (P.T.A.) Limited, Blackburn, Lancashire, England
Filed Oct. 1, 1968, Ser. No. 764,200
Claims priority, application Great Britain, Oct. 2, 1967, 44,802/67
Int. Cl. B21k 5/20
U.S. Cl. 76—107 1 Claim



A method of manufacturing a complex cross section die for the extrusion of plastics material for the purpose indicated comprising dividing the die section into two components each of which can be formed on a die member face by a milling or like machining operation in or on that face, so forming the two die section components as open ducts on opposing surfaces of a tapering die member portion and in register so that the two component ducts merge at the narrow edge of the tapering die member portion together to form an extrusion die orifice of the desired complex shape, the component ducts being closed on their otherwise open sides by die member portions in contact with the tapering die member portion surfaces.

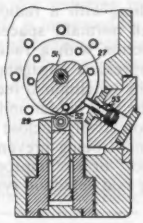
3,587,358
LOW-TEMPERATURE FABRICATION OF DIAMOND-FACED DRILLING BITS
Kunihiro Yoshino, Tokyo-to, Japan, assignor to Kabushiki Kaisha Tone Boring Tokyo-to, Japan
Filed Nov. 21, 1968, Ser. No. 777,783
Claims priority, application Japan, Feb. 24, 1968, Feb. 24, 1968, Sept. 3, 1968, 43/11377; 43/11378; 43/63198
Int. Cl. B21k 5/02
U.S. Cl. 76—108 4 Claims

Diamond particles are secured to a drilling bit body by a metal layer deposited by electrocasting. Melt spraying of the resulting bit with molten metal may be additionally carried out. Throughout the process, the diamond particles are not



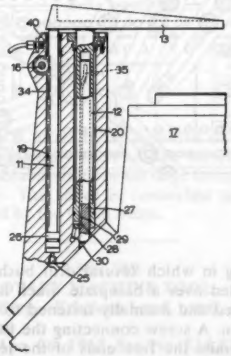
subjected to temperatures exceeding approximately 150° C., whereby their properties are not impaired, and high drilling performance of the bit is afforded.

3,587,359
MACHINE TOOL
Robert M. McCash and Lewis A. Clever, both of Cincinnati, Ohio, assignors to Cincinnati Milseion, Inc., Cincinnati, Ohio
Filed Jan. 22, 1969, Ser. No. 792,926
Int. Cl. B23b 39/00; B23g 3/157
U.S. Cl. 77—3 5 Claims



This invention relates to a machine tool and, more particularly, to apparatus for stopping a spindle at a predetermined angularity.

3,587,360
TOOL LENGTH MEASURING DEVICES FOR USE WITH MACHINE TOOLS
John Oxenham, Boorley Green, near Botley, England, assignor to Vero Precisin Engineering, Ltd., Regents Park, Southampton, Hampshire, England
Filed Jan. 23, 1969, Ser. No. 793,283
Claims priority, application Great Britain, Jan. 25, 1968, 3953/68
Int. Cl. B23b 49/00; B23q 3/157
U.S. Cl. 77—5 7 Claims



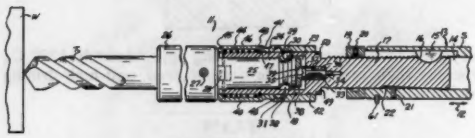
A numerically controlled machine tool which includes a tool length measuring unit which measures each tool inserted into a spindle of the machine and converts the length measurement into an electrical signal which is fed into the control system of the machine to ensure that the travel of the tool during a cutting operation will conform exactly with that desired by the programmer of the machine.

3,587,361

NO TOOL DETECTION SYSTEM AND TOOL HOLDER

Theodore M. Smith, Detroit, Mich.

Filed Mar. 5, 1969, Ser. No. 804,604
Int. Cl. B23b 47/00; B23q 11/00
U.S. Cl. 77—5 7 Claims



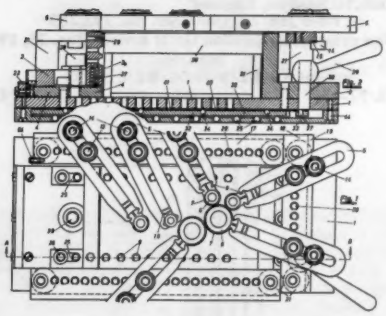
A "no tool," "broken tool" or "improperly set tool" detection device for use with taps, drills, reamers, boring tools, counter bores and milling cutters which includes a tool holder and a movable shell thereon normally biased outwardly of each other, with a radioactive element on the holder and the shell normally spaced from the radioactive element, in conjunction with a radiation detection system whereby upon compressive engagement of the tool with a work piece due to its longitudinal feed, there will be a relative movement of the tool holder and shell such as will position said shell to protectively enclose said radiation element, said relative movement being prevented when there is "no tool," "a broken tool" or an "improperly set tool"; and the method of providing said detection system.

3,587,362

DRILLING JIG

Viktor Cho, Zurich, Switzerland

Filed Oct. 25, 1968, Ser. No. 770,711
Int. Cl. B23b 47/28, 49/04
U.S. Cl. 408—115 5 Claims



A drilling jig in which several drill bush holders are adjustably mounted over a baseplate. Each holder is approximately U-shaped and normally fastened to the baseplate by its bight portion. A screw connecting the two leg portions of the holder permits the free ends of the leg portions to be moved toward and away from each other for clamping a split ring held between the free ends about a drill bush. The holders the positioned on the baseplate by means of a gage having two arms elongated at right angles to each other and carrying respective slides. Cooperating abutments on one slide and on the baseplate determine the position of the gage which is guided relative to the baseplate, and a conical element on the other slide may be engaged coaxially with a drill bush in the holder to be positioned.

3,587,363

BALL PLUNGER INSTALLING AND REMOVAL TOOL

Lawrence W. Rogers, Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

Filed Oct. 14, 1968, Ser. No. 767,194
Int. Cl. B25b 13/50
U.S. Cl. 81—53.2 1 Claim

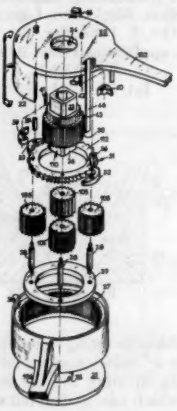
A tool for accurately and precisely installing, and for removing threaded inserts or studs of the ball plunger type. The assembled tool comprises a holder in the shape of a large nut having a threaded bore and a boss formed at one end. A screw of predetermined length and a ball plunger are threaded into the holder with the screw tightened against the ball plunger providing an installing assembly.

3,587,364

TWO ARMED RATCHET WRENCH

Xavier Marie Joseph Antoine Peyre, Brest, France

Filed Oct. 2, 1968, Ser. No. 764,441
Claims priority, application France, Oct. 2, 1967, Sept. 26, 1968, 122930;167756
Int. Cl. B25b 13/46
U.S. Cl. 81—57.39 6 Claims



The wrench comprises two arms pivotally connected as the arms of shears. The first arm is integral with a crown gear which engages planet pinions mounted for free rotation on a planet carrier which rotates about the axis of the crown gear, the planet pinions engage a central sun gear which rotates about said axis and which is solid with the torque head of the wrench and ratchet means integral with the second arm enable to lock the planet carrier in rotation with respect to said second arm for the actuating of said torque head during the movement of said arms, towards each other.

3,587,365

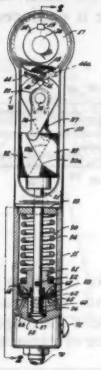
AIR-POWERED WRENCH

Raoul H. De Gaston, Lynwood, Calif.

Filed July 9, 1969, Ser. No. 840,146
Int. Cl. B25b 13/00
U.S. Cl. 81—58.1 7 Claims

This wrench is essentially a hand tool provided with auxiliary power in the form of an air motor for rapidly turning

nuts or other threaded fasteners when moving freely with



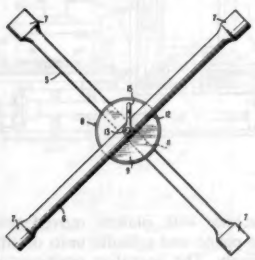
relatively low torque. At the same time, the tool is capable of normal use as a hand-operated tool.

3,587,366

CRUCIFORM, COLLAPSIBLE TOOLS, SUCH AS TIRE WRENCHES AND THE LIKE

Horst Klein, and Manfred Schaefer, Wermelskirchen, Germany

Filed Feb. 10, 1969, Ser. No. 797,950
Claims priority, application Germany, Feb. 28, 1968, K60427/870
Int. Cl. B25b *13/00*; B25g *1/00*
U.S. Cl. 81—177 **2 Claims**



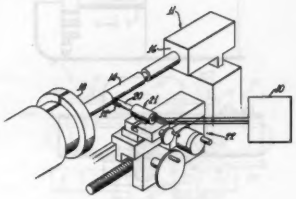
A tool, such as a tire wrench, comprises two arms joined by a threaded bolt for relative pivotal movement from a folded storing position to a cruciform working position. To decrease the bending forces on the bolt when the tool is utilized, a coupling is located between the arms and retained in place by the bolt. The coupling comprises a disc having a first groove in one side, and a second groove at right angles to the first groove in the opposite side. In the cruciform working position, the arms interfit within the grooves, and the threaded bolt is tightened to hold the arms and coupling in their interconnected positions. Manual forces on one arm are resolved by the coupling into a large tensile force component acting axially on the bolt and a negligible bending force component also acting on the bolt. The tensile force on the bolt acts to increase the frictional contact between the surfaces of the second arm and its groove, whereby the major portion of the manual forces on the first arm is transmitted to the second arm by the frictional contact. For better frictional engagement, the interfitting surfaces of the grooves and arms may be roughened.

3,587,367

CUTTING TOOL ION NEUTRALIZER AND METHOD

Richard A. Dotson, Los Angeles, Calif.

Filed Aug. 9, 1968, Ser. No. 751,500
Int. Cl. B23b *3/00*; B23c *1/00*
U.S. Cl. 82—1 **8 Claims**



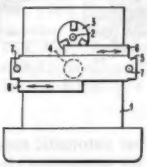
A method and device for reducing tool wear of metal-cutting tools. The tool life is increased by preventing flow of electrons from the tool and consequent ionization of the tool metal atoms during the machining process. This is accomplished in the preferred embodiment by the use of an ion neutralizer device which senses the polarity and magnitude of electron flow and generates an opposite polarity and equal magnitude electron flow which is directed into the tool. The electron flow is reduced in other embodiments of the device by insulating the tool from the workpiece or by insulating the tool or workpiece from the machine frame.

3,587,368

TURRET LATHE OR LIKE MACHINE

Franz Reiners, Berg, Erkelenz-Land, and Georg Walk, Rheydt, Germany

Filed Mar. 18, 1968, Ser. No. 713,723
Claims priority, application Germany, Mar. 17, 1967, M73218
Int. Cl. B23b *13/02*
U.S. Cl. 82—2.5 **8 Claims**



Turret lathe has a turret beam mounted on a turret shaft and extending transversely thereto. The turret beam carries at least one displaceable slider or carriage formed as a tool or workpiece carrier. The slider is connected to a displacing mechanism carried by the turret beam.

3,587,369

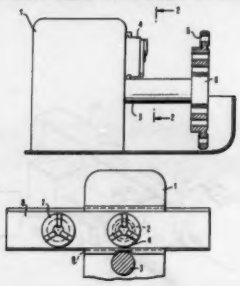
ROTARY MACHINE TOOL

Franz Reiners, Berg, Erkelenz-Land, and Georg Walk, Rheydt, Germany

Filed Apr. 26, 1968, Ser. No. 724,520
Claims priority, application Germany, Apr. 29, 1967, M73796IB/49a
Int. Cl. B23b *13/02*
U.S. Cl. 82—2.5 **1 Claim**

Rotary machine tool includes a rotary spindle mounted in a machine frame and a movable support mounted on the frame and carrying at least two clamping devices. The support is adjustable in a direction transverse to the operating spindle to at least two positions wherein one of the clamping

devices is connectable to the operating spindle for rotating therewith and the other of the clamping devices is accessible



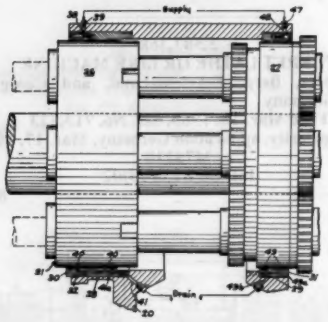
for alternately clamping therein a workpiece to be machined and removing therefrom a workpiece already machined.

3,587,370

MULTIPLE SPINDLE BAR AUTOMATIC MACHINE

Gordon H. Porath, Brighton, and Anthony J. Martin, Livonia, Mich.

Filed May 13, 1968, Ser. No. 728,638
Int. Cl. B23b *9/04*
U.S. Cl. 82—3 **2 Claims**



A multiple spindle bar automatic machine including a base and a spindle carrier for supporting circumferentially rotatable spindles. The base and spindle carrier have complementary spaced cylindrical surfaces. The cylindrical surfaces of the base are formed with circumferentially spaced pressure pads and a restrictor is associated with each said pressure pad. Fluid is supplied under pressure to each said restrictor and pressure pad.

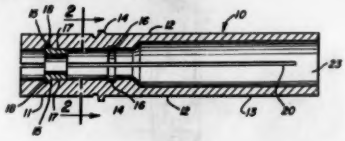
3,587,371

EXPANDING ARBOR-COLLET

John F. Sherwood, Glendora, Calif.

Filed Dec. 11, 1968, Ser. No. 782,834
Int. Cl. B23b *31/40*
U.S. Cl. 82—44 **13 Claims**

An expanding arbor-collet designed to hold work by internal pressure of the arbor within a workpiece, comprising a hollow body and fulcrum means which permit end boring of the workpiece without obstruction by any arbor parts. The fulcrum means is manually movable longitudinally of the body into two positions, one for machining the forward end in preparation for holding the work, and the other for expanding the forward end into work holding engagement. The body has two sets of slots extending inwardly from opposite ends, the slots of one set being located circumferentially between the slots of the other set, whereby a unitary but compressible structure is produced. A concave area on the



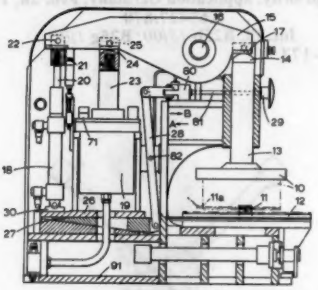
collet body provides for clamping by a chuck and expansion of the work holding end. An arcuate surface adjacent the expansible portion provides for tangential contact of the arbor with the tapered surface of a chuck or other clamping device.

3,587,372

METHOD AND APPARATUS FOR CUTTING A WORKPIECE

Thomas B. Prew, Coppenhall, Stafford, England, assignor to Stafford Tool & Die Company Ltd., Stafford, England

Filed Mar. 26, 1969, Ser. No. 810,667
Claims priority, application Great Britain, Mar. 29, 1968, 15221/68
Int. Cl. B26d *7/10*
U.S. Cl. 83—16 **12 Claims**



A press machine with platens moved relatively to one another by two piston and cylinder units of different capacity acting successively. The operative positions of the units are adjustable relatively and in unison. A form tool is placed between the platens to engage a workpiece and heating means is connected to the form tool to locally heat the workpiece. In use, the form tool is driven into the workpiece to a predetermined depth by one of the units with simultaneous operation of the heating means. Thereafter a final movement of the tool at increased force is effected by the other unit to complete the penetration of the workpiece.

3,587,373

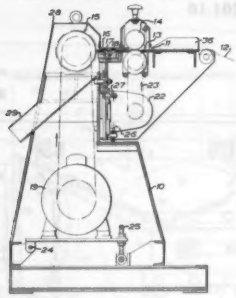
METHODS AND APPARATUS FOR MAKING GRANULES

Carl Vicktor Astrand, Hanaskog, Sweden, assignor to Tarkett AB, Malmo C. Sweden

Filed Mar. 13, 1968, Ser. No. 712,799
Claims priority, application Sweden, Mar. 13, 1968, 3423/1967
Int. Cl. B26d *5/20*
U.S. Cl. 83—43 **16 Claims**

The invention relates to a method of making granules from both relatively brittle and soft materials, such as frozen PVC or rubber, and to an apparatus for performing the method. Characteristic of the method is that the granules are cut individually one after the other from the edge of a continuously

supplied web towards the middle of said web or towards the middle of a number of width sections of said web by cutting



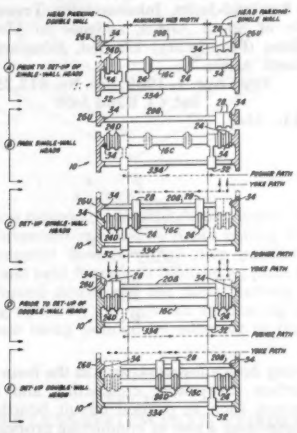
means each having two cutting edges which make an angle with each other and with the plane of the web.

3,587,374

PRESETTABLE SLITTER-SCORER APPARATUS

Warren A. Stewart, Monkton, and Richard J. Bridges, Baltimore, Md., assignor to Koppers Company, Inc.

Filed Apr. 11, 1969, Ser. No. 815,311
Int. Cl. B23d *19/06*; B26d *1/24*
U.S. Cl. 83—56 **17 Claims**



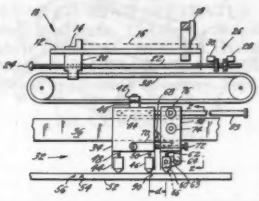
A slitter-scorer machine used in the production of corrugated paperboard having means for presetting one set of slitting heads and scoring heads during operation of another set of such heads comprising two sets of shafts upon which the heads are mounted with the shafts secured between a pair of circular side frames to form a spool arranged for rotation about a central trunnion so that with the spool in one circumferential position one set of shafts with the heads thereon are in position for acting upon an advancing web of paperboard while the other shafts are in an inactive position with a set of yokes being provided to engage the inactive heads and move them to preselected lateral positions across the width of the machine so that upon completion of the order being processed, the spool may be rotated to bring the preset heads into engagement with the web to produce a succeeding order.

3,587,375

SYSTEMS FOR MARKING A MAGNETIC TAPE WITH A REPETITIVE PATTERN

Carl Thumim, Margate City, N.J., assignor to North American Rockwell Corporation, Pittsburgh, Pa.

Filed Jan. 13, 1969, Ser. No. 790,794
Int. Cl. B26d *5/36*
U.S. Cl. 83—71 **15 Claims**



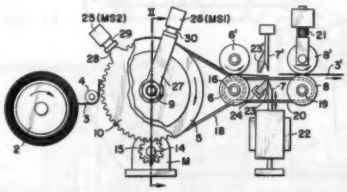
A system for marking a magnetic tape with a repetitive pattern of marks is disclosed, which system is particularly useful in a paper-cutting machine of the type which employs a back gauge movable along a worktable to position a load of paper or the like with respect to a reciprocating guillotine-type knife blade. The system includes a recording head, and a reading head spaced therebehind by a predetermined distance which corresponds to a desired spacing of the marks of the repetitive pattern of marks on the tape. The recording head places a first mark on the tape. Thereafter, when the reading head senses the presence of the mark, it energizes the recording head, now further downstream on the tape, to place a second mark on the tape. This "leapfrog" action continues until the repetitive pattern is complete.

3,587,376

AUTOMATIC ADHESIVE TAPE DISPENSER

Isao Hirano, Tokorozawa-shi, and Nofuhito Nakajima, Tokyo, Japan, assignor to Nichiban Co., Ltd., Cheyoda-ku Tokyo, by Nohichito Nakajima

Filed Apr. 2, 1969, Ser. No. 812,799
Claims priority, application Japan, Apr. 9, 1968, Apr. 10, 1968, Apr. 22, 1968, Apr. 26, 1968, Apr. 27, 1968, 43/23065;43/23439;43/QRPS:NM/27870;43/34201
Int. Cl. B26d *7/14*
U.S. Cl. 83—110 **9 Claims**



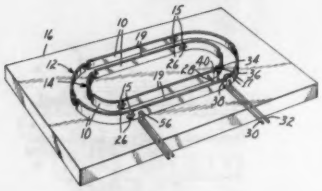
A piece of tape which is cut to length is positioned between a pair of dispensing rollers and when the piece of tape is removed, the rollers come into contact and serve as a closed switch to operate a motor to feed tape from a roll thereof over a feed drum and through a pair of guide rollers to the dispensing rollers. The motor is halted after a dispensing length of tape projects from the dispensing rollers. The dispensing rollers tension the tape as it is fed thereto and a knife device severs the tape as it is held taut between the pairs of rollers.

3,587,377

ELECTRICALLY HEATED DIE-CUTTING APPARATUS

Albert Kenneth Olson, North Oak, and Raymond C. Lundell, White Bear Lake, Minn., assignor to Minnesota Mining and Manufactoring Company, St. Paul, Minn.

Filed Aug. 5, 1968, Ser. No. 750,242
Int. Cl. B26d 7/10
U.S. Cl. 83—171 2 Claims



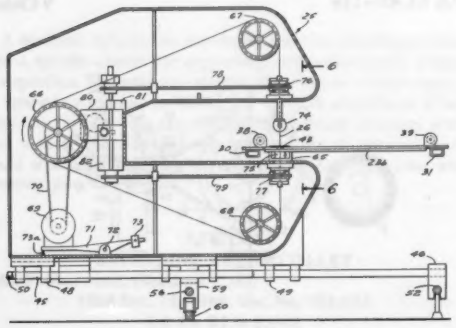
A die-cutting apparatus having a die blade connected into an electrical circuit and adapted to have the die blade electrically resistively heated by the method of passing an alternating current therethrough and a method for using electrically resistively heated die blades for die-cutting a graphic pattern from a thin cuttable material layer is shown. In one embodiment of a die-cutting apparatus, a plurality of die blade segments is formed into a graphic pattern, is electrically connected in an electrically conductive network and is resistively heated by passing an alternating current therethrough. The apparatus is adaptable to both kiss cutting and through cutting. The electrically heated die blade may be substantially enclosed in a heat-insulating foamy layer to retard heat dissipation.

3,587,378

AUTOMATIC MATERIAL CUTTING MACHINE

Henry Oppenheim, Lake Success, and Jonas Walker, Spring Valley, N.Y.

Continuation-in-part of application Ser. No. 583,615, Oct. 3, 1966, Continuation-in-part of application Ser. No. 329,022, Dec. 9, 1963, now abandoned. This application Aug. 29, 1968, Ser. No. 756,271
Int. Cl. B26d 1/46, 5/30, 7/30
U.S. Cl. 83—201.07 9 Claims



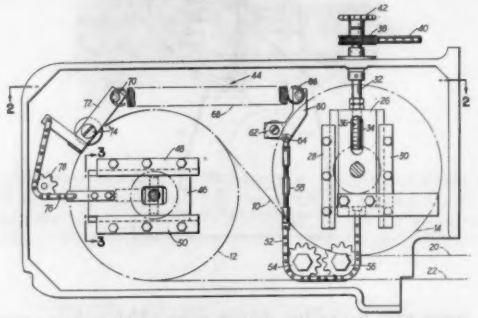
A machine for automatically cutting substantially flat material in a predetermined pattern in response to remote control signals in which the material to be cut is supported in slidable engagement with an underlying surface having an opening through which a cutting element can project to engage and cut said material.

3,587,379

DEVICE TO MAINTAIN CONSTANT TENSION ON DUAL SLICE BLADE

Robert F. Meisoll, and Edgar L. Moss, Jr., Richmond, Va.

Filed Apr. 2, 1969, Ser. No. 812,687
Int. Cl. B26d 1/48, 1/52
U.S. Cl. 83—201.10 6 Claims



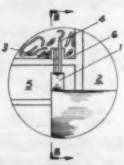
Apparatus for slicing articles, which comprises an endless bandsaw blade, means mounting said bandsaw blade so as to present two-spaced parallel passes for slicing, said mounting means placing a predetermined tension in the blade, means for varying the distance between said two-spaced passes, and means for maintaining the tension in said blade constant when the distance between said bandsaw blade passes are varied.

3,587,380

WORKPIECE-LOCATING DEVICES

Henry E. Rowland-Jones, Johannesburg, Transvaal Province, Republic of South Africa, assignor to Metal Signs and Nameplates (Proprietary) Limited, Johannesburg, Republic of South Africa

Filed Apr. 1, 1969, Ser. No. 812,251
Int. Cl. B26d 5/00
U.S. Cl. 83—364 9 Claims



A locating device for workpiece in the form of boards having a surface comprising conducting and nonconducting areas thereon such as printed circuit boards, the locating device comprising a pair of conducting probes connected via a latching relay to an electrically actuated and downwardly movable clamp and means for further locating a workpiece with respect to the clamp.

3,587,381

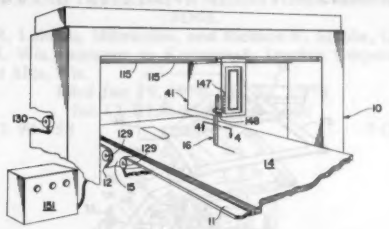
MATERIAL CUTTING MACHINE HAVING RECIPROCATING CUTTING BLADE ADAPTED TO ENTER MATERIAL WITHOUT AN ENTRANCE CUT

George W. Sederberg, Highland Heights, Ky., assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed May 6, 1968, Ser. No. 726,657
Int. Cl. B26d 1/06
U.S. Cl. 83—424 19 Claims

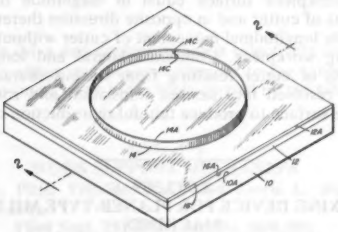
A material cutting machine has a reciprocating cutting blade mounted for cutting material, which is movable both transversely and longitudinally relative to the cutting blade. Means, which does not reciprocate with the cutting blade but moves with the cutting blade when it is lifted upwardly from the material or moved downwardly into the material, pro-

vides a guide for the blade during cutting. The cutting blade has its lower end sharpened or the lower end of the guide means sharpened or both are sharpened so that the material is pierced to permit entry of the cutting blade and the guide means into the material. The lower ends of both the guide



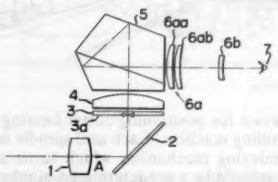
means and the cutting blade are supported by support means beneath the material. The support means is rotated simultaneously with the cutting blade so that the support means is maintained in the desired alignment with the cutting blade when the heading of the cutting blade is changed.

3,587,382
DIE FOR CUTTING PAPER
Harry S. Boyd, Tulsa, Okla.
Filed Oct. 8, 1968, Ser. No. 765,920
Int. Cl. B26d *1/02*
U.S. Cl. 83—651 **8 Claims**



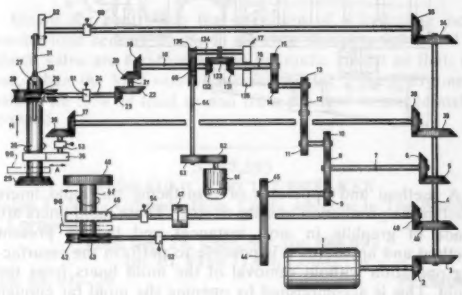
This invention relates to a die for cutting paper. More particularly, the invention relates to a paper cutting die formed of a thin elongated flexible metal strip positioned on a backing plate and held there by a reinforcing plate of severable material forced down over the metal cutting strip, the strip extending upwardly through the reinforcing plate, the reinforcing plate being bonded by adhesive to the backing plate.

3,587,383
FINDER LENS SYSTEM IN VIEWFINDER
Yohei Ikezu, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh Tokyo, Japan
Filed June 3, 1969, Ser. No. 829,918
Claims priority, application Japan, June 4, 1968, 43/46727
Int. Cl. G03b *13/06;* **G02b** *17/00*
U.S. Cl. 88—1.5 **2 Claims**



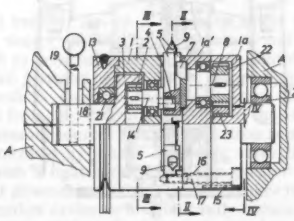
A viewfinder lens system for a hollow penta-roof-type reflecting mirror having an object lens and focal plane on one side of the reflecting mirror and a positive meniscus lens group located at 90° along the optical axis on the other side of the reflecting mirror along with a negative lens spaced from said positive lens group further along the optical axis. With the use of such hollow reflecting mirror it is desired to increase the magnification, and this is accomplished by designing the compound focal length of the positive and negative lens group to be at least equal to the focal length of the object lens, and the focal point of the positive and negative group to coincide with the focal plane.

3,587,384
GEAR SHAPING APPARATUS
Hans J. Ditschler, Karlsruhe, Germany, assignor to Maschinenfabrik Lorenz AG, Ettlingen, Germany
Filed Sept. 3, 1968, Ser. No. 756,742
Claims priority, application Germany, Sept. 2, 1967, P 16 27 364.6
Int. Cl. B23f *5/20*
U.S. Cl. 90—7 **21 Claims**



A gear shaping apparatus wherein the workpiece and a cutting wheel are mounted for rotational movement about their respective axes and for relative movement towards and away from each other. The drive mechanism which rotates the workpiece and the cutting tool includes a control means for varying the relative rotational speed between the workpiece and the cutting wheel. The control means may be operated in response to either the said rotative movement or the said relative movement.

3,587,385
CUTTER HEAD
Friedrich Orend, Bad Gandersheim, Germany, assignor to Voitk Getriehe KG, Heidenheim (Brenz) Germany
Filed Oct. 29, 1968, Ser. No. 771,587
Claims priority, application Germany, Nov. 9, 1967, P1627130.0
Int. Cl. B23f *21/12*
U.S. Cl. 90—11 **8 Claims**



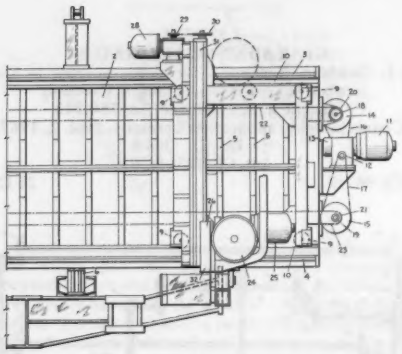
A cutter head which includes rotatable carrier means, cutting blade means carried by and at least approximately radially displaceable in said carrier means, and means operatively connected to said cutting blade means and operable in response to a substantially uniform rotation of said carrier means about its axis of rotation to bring about a movement of said cutting blade means relative to said carrier means.

3,587,386

METHOD AND APPARATUS FOR RESURFACING STEEL MOLDS

Walter J. Weidner, Upper Leacock Township, Lancaster County, Pa.

Filed Sept. 10, 1968, Ser. No. 758,899
Int. Cl. B23c 3/00, 1/20; B24b 23/02
U.S. Cl. 90—12 3 Claims



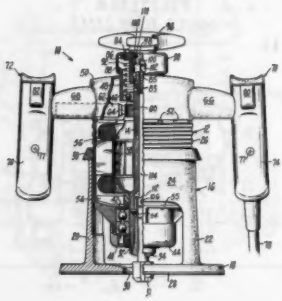
A method and apparatus of resurfacing the mold liners used in the production of slabs of steel. These mold liners are made of graphite in most instances and by the present method and apparatus it is possible to perform the resurfacing operation without removal of the mold liners from the mold. This is accomplished by opening the mold far enough to place a device within the space between the mold liners and traversing the length and height of the mold liners by a resurfacer which removes the irregular surface and restores the smooth surface required for the production of slabs of steel.

3,587,387

ROUTER

Milford D. Burrows, Avon, and Phillipp J. Quedens, Newington, Conn., assignor to The Stanley Works, New Britain, Conn.

Division of Ser. No. 621,601, Mar. 8, 1971. This application Apr. 3, 1969, Ser. No. 851,506
Int. Cl. B23c 1/20
U.S. Cl. 90—12 2 Claims



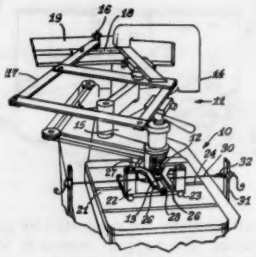
The electric router of this invention includes an axial slip coupling having a rotary knob mounted for axial movement at the top of the router for selectively unlocking and locking a chuck upon turning the knob in a depressed operative position. The router further includes twin switch handles actuable in a two hand operation for operating normally open motor control switches connected in series.

3,587,388

DEVICE FOR USE IN REPRODUCING CHARACTERS ON CYLINDRICAL SURFACES

Charles F. Muehlenweb, Albuquerque, N. Mex.

Filed Feb. 24, 1969, Ser. No. 801,651
Int. Cl. B23c 1/18
U.S. Cl. 90—13.1 6 Claims



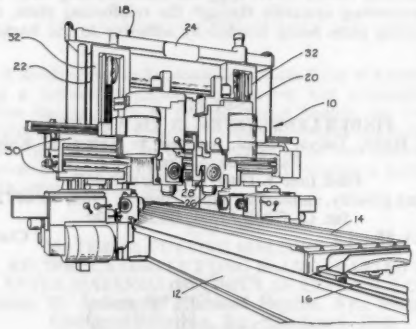
Device for attachment to or incorporation in engraving machines and the like, particularly those which utilize a flat master pattern to guide a cutter, scriber, or other tool for reproduction. Enables reproducing without major alterations or adjustment to machine. Workholder carriage, movable laterally and having a rotatable chuck for grasping cylindrical workpiece, is linked to cutter or reproducer to maintain workpiece in alignment therewith. Wire wrapped around workpiece and anchored to stationary brackets causes rotation of workpiece surface equal in magnitude to lateral movements of cutter and in opposite direction thereto. Linkage permits longitudinal movement of cutter without moving or rotating workpiece. Combined lateral and longitudinal movements of cutter resulting from tracing character patterns are resolved into desired translation and rotation of workpiece surface to produce faithful reproduction of master pattern.

3,587,389

INDEXING DEVICE FOR PLANER-TYPE MILLING MACHINES

Alfred Kreimer, Cincinnati, Ohio, assignor to G. A. Gray Company, Cincinnati, Ohio

Filed May 5, 1969, Ser. No. 821,820
Int. Cl. B23c 1/12
U.S. Cl. 90—17 13 Claims



Indexing device for positioning cutter bearing spindles in a planer-type milling machine. Each said spindle is mounted on a rotatable indexing mechanism which turns a cutting element on said spindle to a predetermined number of compass settings relative to the axis of said spindle. The indexing mechanism is characterized by a coupling having a first part rotatable in only a single direction, and a second part rotata-

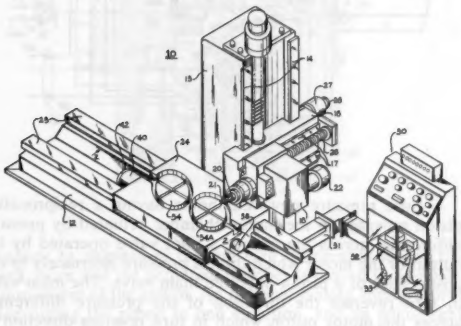
ble in two directions. The rotation of the spindle is effected by said coupling which in turn is activated by an hydraulic cylinder.

3,587,390

INDEX AND TABLE DRIVE MEANS FOR A MACHINE TOOL

Earl R. Lohneis, Milwaukee, and Richard E. Stobbe, Greenfield, Wis., assignor to Kearney & Trecker Corporation, West Allis, Wis.

Filed Jan. 19, 1970, Ser. No. 3,978
Int. Cl. B23d 7/08; B23f 23/08
U.S. Cl. 90—58 7 Claims



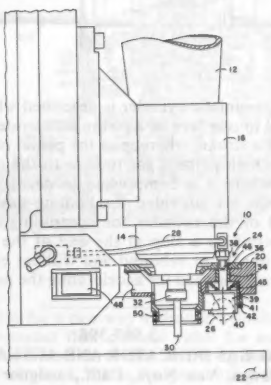
A single drive and control means is selectively engageable to provide either rectilinear movement to the table base or rotary movement of an index table carried by the table base.

3,587,391

WORK SUPPORT MECHANISM

Robert D. Pitts, Yellville, Ark., and Lewis L. McAllister, Marion, Iowa

Filed Sept. 25, 1969, Ser. No. 860,881
Int. Cl. B23c 9/00; B25b 11/00
U.S. Cl. 90—11R 14 Claims



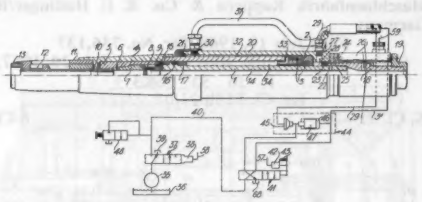
A work support mechanism for use with a shaping machine including a plurality of hold down assemblies and rollers for supporting a work piece in the immediate vicinity of a machining operation.

3,587,392

MEANS FOR CONTROLLING THE OPERATION OF HYDRAULICALLY OPERATED JACKS

Hugh Jeremy Willis Edwards, Cobham, Surrey, England, assignor to Cable Covers Limited, Surrey, England

Filed Jan. 21, 1969, Ser. No. 792,606
Int. Cl. F01b 25/26; F15b 15/04; E04c 3/26
U.S. Cl. 91—1 9 Claims



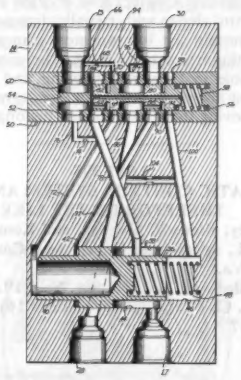
Means for controlling the operation of a hydraulic jack having load sensing means in which a dumping valve and a check valve are arranged in the hydraulic circuit so that, in use, when the load sensing means register a predetermined value, the flow of fluid to and from the ram is immediately stopped.

3,587,393

HYDRAULIC CIRCUIT BREAKER

Ralph L. Vick, Granada Hills, Calif., assignor to The Bendix Corporation

Filed Dec. 29, 1969, Ser. No. 888,692
Int. Cl. F15b 11/08, 13/042
U.S. Cl. 91—29 10 Claims



A circuit breaker device is disclosed which is interposed between a source of fluid under pressure and a utilization device such as an actuator. A piston-type shutoff valve is included which is spring biased toward its open position. A pair of fixed orifices measure the flow toward the utilization device and from the utilization device to the return side of the fluid pressure source. The pressure drop across these orifices is controlled by means of a slide valve biased in one direction with a light spring. Should a greater than normal flow appear downstream of the circuit breaker in the conduit to the utilization device or a significantly reduced flow in the return line, this will be reflected in a lowered pressure on one side of the shutoff valve, and it will begin to move in a closing direction. Damping orifices are connected to limit the velocity of movement of the shutoff valve to avoid premature closing due to transient conditions. When the utilization device demands a greater flow than required for steady state operation, a momentary increased pressure drop appears across the slide valve, opening substantial orifices in parallel with the fixed orifices and permitting greater flow through

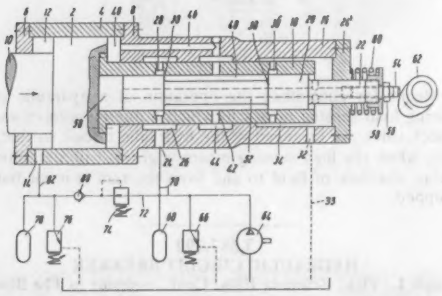
the circuit breaker so that the pressure drop remains substantially constant while the required increased flow is provided. This also permits faster movement of the shutoff valve in case of a leak to avoid excessive loss of fluid.

3,587,394

HIGH SPEED CONTROL VALVE FOR HYDRAULIC DRIVES

Jan Willem Hilbrands, Hattigen, Ruhr, Germany, assignor to Maschinenfabrik Koppern & Co. K G Hattinger/Ruhr, Germany

Filed July 19, 1968, Ser. No. 746,137
Claims priority, application Germany, July 20, 1967, P 16 53 566.3
Int. Cl. F15b *21/02, 15/17*
U.S. Cl. 91—39 **8 Claims**



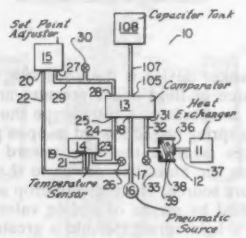
An improved hydraulic drive with a reciprocating working piston whose side remote from the load may be affected by a liquid or gaseous pressure medium, and comprising a control valve with an axially displaceable control slide, adapted to move in a control sleeve with radially disposed inlet and outlet orifices, wherein the improvement comprises adaptation for high operating frequencies in that the control sleeve is axially displaceable in the valve housing and is directly connected with the piston, and by providing a revolving cam for periodically moving the spring-loaded piston slide.

3,587,395

PNEUMATIC CONTROL SYSTEM AND PARTS THEREFOR OR THE LIKE

Larry V. Nisley; Klaus P. Mueller, and Kenneth G. Kreuter, Goshen, Ind., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Apr. 8, 1968, Ser. No. 719,495
Int. Cl. F15b *13/042, 11/08;* **F16j** *3/00*
U.S. Cl. 91—47 **44 Claims**



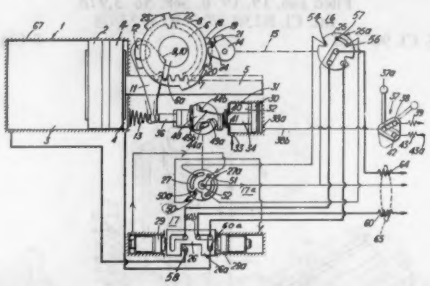
This disclosure relates to a vacuum temperature control system wherein a pair of vacuum signals respectively from a temperature sensor and a temperature selecting means are translated by a comparator into a vacuum control signal that operates a temperature output means for the system in relation to the vacuum control signal to produce a proportional action thereof, the system, however, having vacuum signal means for resetting the comparator to slowly eliminate the proportional action caused by the comparator.

3,587,396

FLUID-PRESSURE-OPERATED MOTORS

John Horace Gadd, Sunningdale; Ruben Hadekel, London, and Edmund Joseph Sumins, London, England, assignor to Trico Products Corporation, Buffalo, N.Y.

Filed Feb. 14, 1969, Ser. No. 799,455
Claims priority, application Great Britain, Feb. 16, 1968, 7786/68
Int. Cl. F01l *15/04, 25/06*
U.S. Cl. 91—239 **10 Claims**



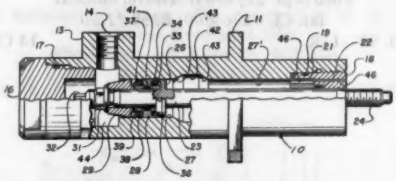
A fluid pressure powered motor having a reciprocating piston movable in the motor chamber actuated by pressure differential across the piston; a pilot valve operated by the output of the motor which directs pressure alternately to opposite sides of a piston operated main valve. The main valve in turn reverses the direction of the pressure differential across the motor piston which in turn reverses direction of movement of the motor piston.

3,587,397

ACCELERATION-DECELERATION PNEUMATIC DEVICE

Berge Hagopian, Costa Mesa, Calif., assignor to North American Rockwell Corporation

Filed Sept. 30, 1968, Ser. No. 763,688
Int. Cl. F15b *15/22;* **F16j** *9/00*
U.S. Cl. 91—399 **2 Claims**



A single pneumatic cylinder is described wherein gas pressure applied to one face of a piston accelerates the piston for a portion of a stroke, whereupon the piston reaches a gas relief region which permits gas to flow to the opposite side of the piston where it is compressed to decelerate the piston. Orifice means are provided for limiting gas flow from the second end of the cylinder for controlling deceleration to bring the piston to a stop at the end of the stroke without substantial impact or rebound and without ceasing the flow of pressurizing gas used for accelerating the piston.

3,587,398

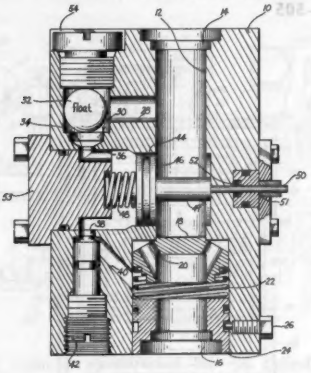
LIQUID-TO-GAS INDICATOR AND ACTUATOR DEVICE

Leslie J. Dawes, Van Nuys, Calif., assignor to The Bendix Corporation

Filed Oct. 31, 1969, Ser. No. 873,047
Int. Cl. F15b *11/08, 13/04*
U.S. Cl. 91—419 **6 Claims**

A liquid-to-gas indicator is disclosed which, in one position, will normally flow liquid and will sense and respond to the beginning of gas flow by moving a mechanical actuating member which may operate a microswitch or other output

device. When inverted, the device will normally flow gas but will respond to the beginning of liquid flow by moving the actuating member as described. A spring-loaded check valve is installed in a main conduit with a float-type ball valve in a parallel conduit connected across the check valve. A piston is positioned in the wall between the conduits such that it



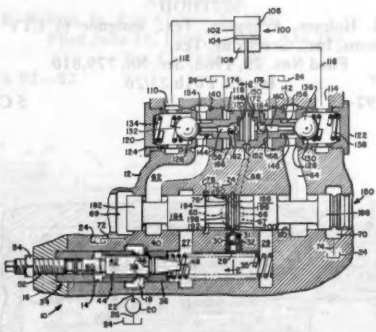
responds to changes in the pressure differential across the check valve and the actuating member is moved in response to movement of the piston. An optional biasing spring is provided urging the piston in one direction, and an adjustment screw is provided for varying the flow rate of the parallel conduit.

3,587,399

CONTROL VALVE MEANS FOR A TWO-WAY HYDRAULIC CYLINDER

Donald James Parquet, Dike; Daniel Luce Hall, Waterloo, and Stanley Martin Gregerson, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed May 2, 1969, Ser. No. 821,350
Int. Cl. F15b *11/05, 13/042*
U.S. Cl. 91—420 **6 Claims**



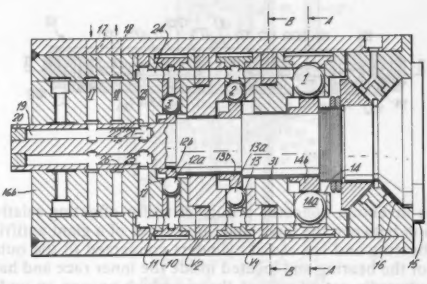
A control valve for a two-way hydraulic cylinder includes a pressure-compensated flow control valve for maintaining a constant predetermined flow rate to the hydraulic cylinder and has a pair of check valves for preventing the return of fluid from the ends of the hydraulic cylinder, a pair of opposed hydraulically operated pistons responsive to fluid pressure between their faces for respectively engaging and unseating the check valves and a manually operated spool-type direction control valve for selectively connecting the outlets of the pressure-compensated valve to one or the other of the ends of the hydraulic cylinder and to the faces of the opposed pistons.

3,587,400

TRIPLE BALL MOTOR SPINDLE DRIVE

Donald Firth, and Sinclair Upton Cunningham, East Kilbride, Glasgow, Scotland, assignor to National Research Development Corporation, London, England

Filed Dec. 10, 1968, Ser. No. 782,664
Claims priority, application Great Britain, Dec. 29, 1967, 59128/67
Int. Cl. F01b *1/06, 13/06*
U.S. Cl. 91—492 **9 Claims**



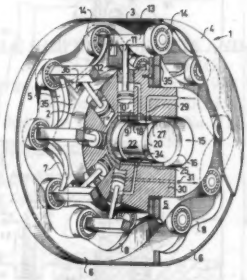
The invention relates to a ball motor in which there are a number of rows of balls contained in cylinders, the cylinders and balls in adjacent rows being of different sizes. Means are provided to render inoperative rows of cylinders in a predetermined order so as to produce a desired torque curve.

3,587,401

HYDRAULIC RADIAL MOTOR

Fritz Agne Johansson, Skelleftea, Sweden

Filed Mar. 3, 1969, Ser. No. 803,759
Claims priority, application Sweden, Mar. 7, 1968, 3039/1968
Int. Cl. F01b *1/06, 13/06;* **F01l** *33/02*
U.S. Cl. 91—496 **3 Claims**

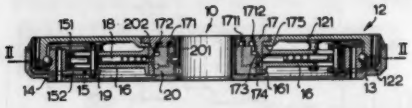


The present invention relates to an hydraulic motor having a number of pistons arranged for radial motion in a cylinder block which preferably forms the stationary part of the motor. The pistons are, over piston rods extending outwardly of the pistons, connected to cam rollers arranged for cooperation with at least one circumferentially closed cam curve radially surrounding said cam rollers. The cam curve is rigidly connected to the motor casing and rotatable relatively the cylinder block. The number of cams on the cam curve is different from the number of pistons. The pistons are arranged upon supply of a pressure fluid to working chambers located radially inside the pistons to cause the cam curve and thereby also the motor casing to rotate relatively the cylinder block.

3,587,402
PRESSURE MEDIUM OPERABLE DRIVE FOR GIANT ANTIFRICTION BEARINGS

Wilhelm Schluter, Dortmund-Gartenstadt, and Rolf Thonigs, Dortmund-Lucklemberg, Germany

Filed May 2, 1969, Ser. No. 821,402
Claims priority, application Germany, May 8, 1968, P 17 50 497.1
Int. Cl. F01b 1/06, 13/06; F01l 33/02
U.S. Cl. 91—498 13 Claims

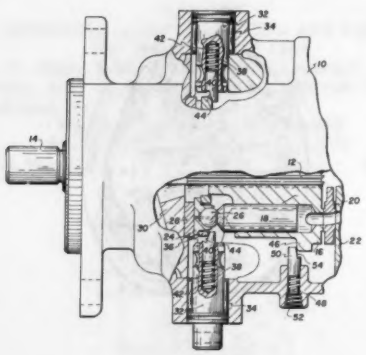


The invention concerns a fluid drive for effecting relative rotation between the inner and outer races of a giant antifriction bearing and has radial cylinders connected to the outer race of the bearing and located inside the inner race and having outwardly acting pistons therein which engage an undulating cam connected to the inside of the inner race of the bearing. A ring element connected to the radially inner ends of the cylinders receives a tubular block that is connected to the inner race and fluid is supplied to the cylinders and exhausted therefrom by passages extending from the cylinders through said member and block.

3,587,403
POWER TRANSMISSION

Donald C. Connett, Rochester, Mich., and Arthur R. Whited, Jr., Windsor, Ontario, Canada, assignor to Sperry Rand Corporation, Troy, Mich.

Filed Jan. 16, 1970, Ser. No. 3,443
Int. Cl. I04b 1/02
U.S. Cl. 91—504 8 Claims

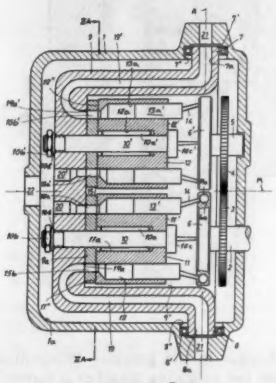


A hydraulic pump or motor unit of the axial piston type having a revolving cylinder barrel driven by an inline shaft has an improved means for preventing separation of the hydrostatic bearings at the piston ends and at the cylinder barrel face. A revolving flange at the back of the hydrostatic bearing is contacted by several nonrevolving shoes which are biased toward the flange with a wedging action which allows takeup of any wear in the bearing surfaces but does not allow the shoes to be moved retractively by the separation forces created at the hydrostatic bearing.

3,587,404
HYDRAULIC-MACHINE ARRANGEMENT WITH A PLURALITY OF MACHINE UNITS

Dietrich Kratzenberg, Hirtenborn, Germany, assignor to Linde Akliengeselschaft, Wiesbaden, Germany

Filed Apr. 23, 1969, Ser. No. 818,502
Claims priority, application Germany, Apr. 24, 1969, P1,703,260.9
Int. Cl. F01b 3/00, 13/04
U.S. Cl. 91—505 3 Claims

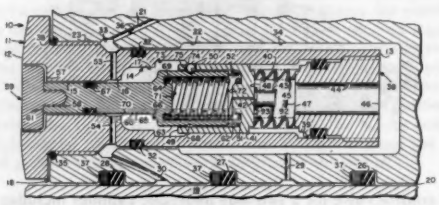


A hydraulic-machine arrangement for two or more hydraulic units (e.g. pumps or motors) wherein at least two such units are mounted in a common swingable frame such that the frame, upon angular displacement about its axis, angularly shifts the cylinder drums of the axial piston pump or motor from its null position to an operative position; the pivotal frame has hollow pivot pins through which fluid communication with the respective axial piston machines is established.

3,587,405
INDICATING AND SEAL ACTIVATING DEVICE AND METHOD

Lloyd H. Holmes, Arlington, Tex., assignor to LTV Electrosystems, Inc., Greenville, Tex.

Filed Nov. 29, 1968, Ser. No. 779,810
Int. Cl. F01b 25/26
U.S. Cl. 92—5 5 Claims



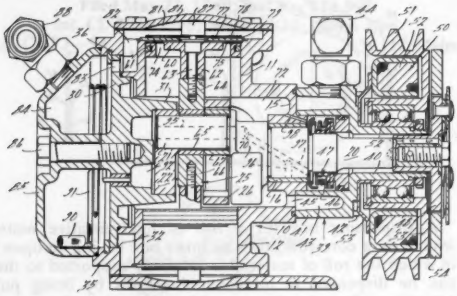
A device and method useful in conjunction with a hydraulic actuator for providing a signal to indicate that a seal of the actuator has leaked fluid at an excessive rate and for functionally replacing such seal with a secondary seal, which secondary seal is maintained substantially inactive in the fluid circuit until fluid leakage past the primary seal exceeds a predetermined amount.

3,587,406

COMPRESSOR

Edwin L. Gannaway, Sidney, and Robert M. Draper, Sidney, Ohio, assignor to Copeland Refrigeration Corporation, Sidney, Ohio

Filed July 26, 1968, Ser. No. 747,920
Int. Cl. F01b 1/02, 31/10
U.S. Cl. 92—74 5 Claims



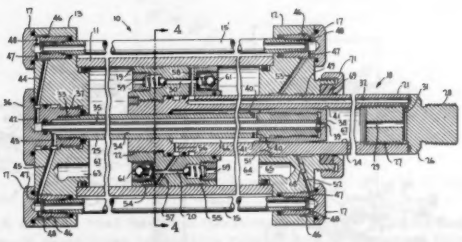
A four cylinder compressor has its cylinders radially spaced 90° around a crankshaft and arranged as two pairs of coaxial opposed cylinders, the two pairs being slightly offset along the axis of the shaft, the two cylinders of each pair having individual pistons rigidly connected by means including a transverse yoke drivable by the crankshaft through an interposed slide. The diecast cylinder body has a necked closure at one end which supports internally the driveshaft seal and front crankshaft bearing and carries externally the drive pulley bearing and magnetic clutch. At its other axial end a sealed and chambered closure assembly defines the discharge plenum and oil sump and carries the rear bearing which journals a disc which defines the rear throw of the crankshaft. Individual heads and discharge valve plates are on the cylinders. Intake valves are in the pistons. Lubrication is through a capillary tube from a high pressure oil sump in the discharge plenum via a low pressure oil chamber behind the crankshaft.

3,587,407

SELF-PRESSURE GENERATING FLUID-POWERED ACTUATOR

Andy R. Wilson, Jr., Los Alamos, N. Mex.

Filed June 18, 1969, Ser. No. 834,295
Int. Cl. F15b 3/00
U.S. Cl. 92—82 9 Claims



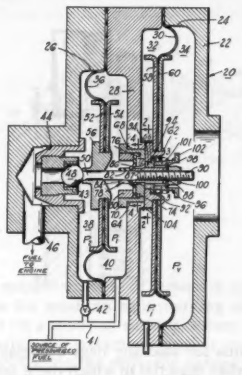
A self-contained fluid-powered linear actuator or cylinder using an external source of pressurized fluid for motive power and external valving for stroke reversal, means to route fluid within the device, means to automatically intensify the pressure level of a portion of the operating fluid for use as fluid bearings and fluid seals between moving parts within the device, and means to automatically replenish the intensification chambers provided therein, thereby eliminating the need for internal dynamic seals and minimizing wear of the actuator components.

3,587,408

DIAPHRAGM-TYPE FLUID SEAL

Elmer A. Haase, and James M. Kirwin, South Bend, Ind.

Filed May 27, 1969, Ser. No. 828,178
Int. Cl. F01b 19/00
U.S. Cl. 92—89 6 Claims



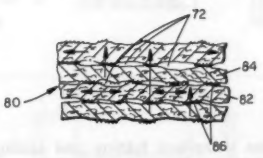
A diaphragm-type fluid seal adapted for use with a push rod exposed to pressurized air and liquid fluids. A flexible diaphragm fixedly mounted at its radially outermost portion is provided with a central opening through which the push rod extends providing frictional engagement and thus a fluid seal between contacting surfaces of the diaphragm and rod thereby isolating the pressurized air and liquid. The diaphragm is flexible to the extent of axial movement of the rod to avoid relative movement between the diaphragm and rod in response to rod movement. An adjustable member threadedly carried by the rod and engageable with the centermost portion of the diaphragm provides a way of easily and accurately positioning the diaphragm relative to the rod to eliminate undesirable spring rate effect of the diaphragm on the rod.

3,587,409

DISPOSABLE DIAPER PRODUCTS AND METHOD OF MANUFACTURING

William E. Berge, Birmingham, Mich. (998 Top View Road, Bloomfield Hills, Mich).

Filed Mar. 6, 1968, Ser. No. 711,014
Int. Cl. B31d
U.S. Cl. 93—1 7 Claims

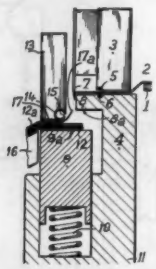


Disposable diapers and other products including a method of manufacture from fibrous creped cellulose material whereby multiple plies of the material are received together without abrasive action disruptive of the fibrous surface texture and under a tension interlocking the creped surfaces when relaxed to provide appreciably higher absorption and lateral dispersion rates for dissipating the aqueous solution of urea and precluding bacterial growth conductive to ammoniacal odors and skin irritations.

3,587,410
APPARATUS FOR STACKING BAGS

Bernard Dechanciaux, and Georges Logain, both of Ermont, France

Filed June 16, 1969, Ser. No. 833,512
Claims priority, application France, June 26, 1968, 156,680
Int. Cl. B31b 1/14
U.S. Cl. 93—33 11 Claims

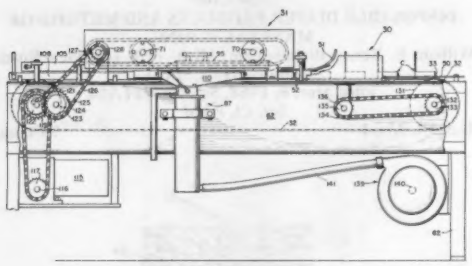


An apparatus for stacking bags especially bags formed of synthetic plastics material in which there are upper and lower gripping and sealing jaws with a movable cutter associated with these jaws to cut off a bag length from a tube or sheath of material, the lower jaw having a flange under which is disposed a bag support with the flange and bag support being relatively vertically displaceable to permit gripping and holding therebetween of the end of a bag or stack of bags and retaining member for holding the bag on the support until the bag takes up a flat condition.

3,587,411
APPARATUS AND METHOD FOR CLOSING AND SEALING CARTONS

Ezra E. Theys, San Mateo, and Hugh B. Morse, San Jose, Calif., assignors to Fibreboard Corporation, San Francisco, Calif.

Filed Feb. 17, 1969, Ser. No. 799,783
Int. Cl. B31b 1/30, 1/62, 1/54
U.S. Cl. 93—36.3 28 Claims

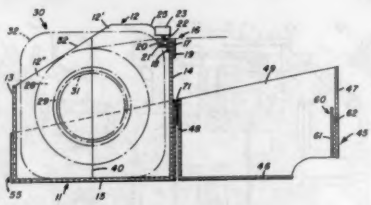


An apparatus comprises folding and sealing stations for progressively folding adhesively treated carton flaps into superimposed relationship and for sealing the flaps together. The folding may be occasioned by a horizontally disposed tucker wheel positioned on each side of the carton for folding three minor flaps and a plow bar for folding a cover flap over the aforementioned minor flaps. The carton is then conveyed to the sealing station whereat a nozzle means moves along with the carton to discharge heated air onto juxtaposed portions of the carton flaps. Means are then provided for compressing the flaps together. A second embodiment incorporates the nozzle means into the tucker wheel to perform the folding and sealing steps substantially simultaneously.

3,587,412
CARDBOARD BOX AND METHOD OF MAKING SAME

Raymond J. Thomas; William G. McDonald, and Walter B. Dunning, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 31, 1968, Ser. No. 772,215
Int. Cl. B31b 1/62, 1/72, 9/14
U.S. Cl. 93—39 4 Claims

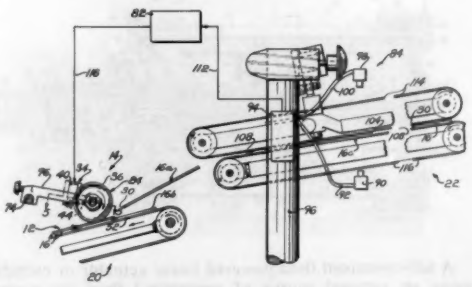


A dispensing box for a roll of light-sensitive material wound on a core comprises an inner box having an open top in which the roll of material is rotatably supported so that it can be dispensed in incremental lengths by being pulled across a guide and cutter assembly mounted on the rear edge of the box. The open top of the inner box is covered by an outer box having an open end slid down over its open top and having a hinged cover, which when open, provides easy access to the open top of the inner box, and which when closed, cooperates with the walls of the inner box to provide a light-tight closure therefor. A novel method of making this box, or any box having a hinged cover, is to form up two open-ended boxes of complimentary shape from flat blanks of boxboard, then telescope the open end of one box onto the open end of the other and fasten them together near the closed end of the inner box, score one wall of the outer box to provide a hinge line thereacross, then cut through the other walls of the outer box to form a continuous cut joining the two ends of said hinge line. Preferably, the scored hinge line will be made in the flat blank for the outer box before it is formed up and will have cemented in covering relation therewith a strip of suitable flexible material to act as a hinge for the cover.

3,587,413
METHOD AND APPARATUS FOR INDICATING GROUPS OF ARTICLES

Albert J. Sarka, Fairview, Ohio, assignor to Harris-Intertype Corporation, Cleveland, Ohio

Filed Aug. 30, 1968, Ser. No. 756,686
Int. Cl. B65h 33/00
U.S. Cl. 93—93 16 Claims



In a method and apparatus for indication groups of sheet-like articles or carton blanks in a stream of articles moving along a conveyor assembly the carton blanks are skewed to thereby indicate the last carton blank of a group of carton blanks. The carton blanks are skewed upon rotation of a roller which accelerates a portion of a carton blank. The

roller is rotated in response to a counter assembly receiving a predetermined number of signals or pulses from a photoelectric sensor assembly which detects the passage of the carton blanks along the conveyor assembly.

3,587,414

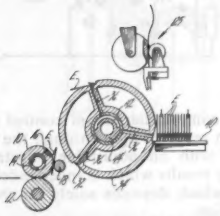
ARTICLE COUNTING SYSTEM

Maximiliano Rappaport, Oradell, N.J., assignor to United States Envelope Company, Springfield, Mass.

Filed May 22, 1969, Ser. No. 826,961

Int. Cl. B31b *1/98;* **B65b** *57/20;* **G06m** *7/06*

U.S. Cl. 93—93 **12 Claims**



In a machine for handling articles, such as flat blanks, wherein the blanks are transferred part way around suction rolls or wheels, a system for counting such blanks, including a magnetically operated reed switch for generating successive count signals proportional in time to the angular speed of rotation of the rolls or wheels, and a pressure sensitive pickup for producing an inhibit signal whenever suction pressure is lost due to a missing blank. The number of count signals is reduced by any inhibit signal and the result fed to a counter which thereby records the number of actual blanks handled. The counter, through a variable time delay controls the operation of a device for grouping predetermined numbers of these blanks for banding or the like.

3,587,415

ROADWAY SURFACE MARKING, AND MARKED ROAD

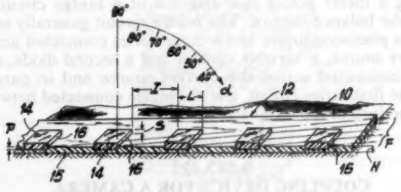
Ludwig Eigenmann, Milan, Italy (c/o Cicogna Eranco & C., 14/A, Via Visconti di Modrone, Milan, Italy)

Filed Sept. 4, 1968, Ser. No. 757,409

Claims priority, application Italy, Sept. 5, 1967, 811581

Int. Cl. E01c *23/16*

U.S. Cl. 94—1.5 **12 Claims**



A marked road having a roadway surface for vehicles and one or more strips of marking tape joined to the upper face of said surface. Said marking tape consists, in its parts adjacent to its upper face, of a composition ensuring optimum daylight visibility and traffic endurance, forming the greatly prevailing part of the marked surface area. A plurality of spacedly located elements is evenly arranged on and partly embedded in a base strip of said composition, and consisting of a composition including a substantial amount and preferably over 20 percent and as high or even higher than 80 percent by weight of transparent glass microspheroids ensuring high light reflection efficiency to said elements when viewed at might.

3,587,416

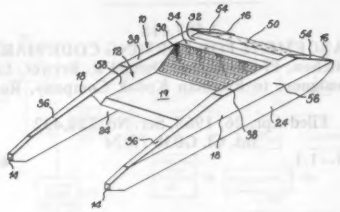
PAVEMENT MARKER AND MOUNTING BASE MEMBER

Robert M. Flanagan, Summit, N.J., assignor to Amerace Esna Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 655,166, July 21, 1967, now abandoned , and a continuation-in-part of 734,609, June 25, 1968, now abandoned. This application July 30, 1969, Ser. No. 846,016

Int. Cl. E01c *23/16*

U.S. Cl. 94—1.5 **17 Claims**



In a pavement marker capable of service in snow areas and having a reflector for establishing a marking visible from an oncoming vehicle on a roadway surface, a base member constructed for securing the pavement marker to the roadway surface and for protecting the reflector against damage from an oncoming snowplow blade during snow plowing operations, the base member having a body of high strength material, preferably a metal, and including sidewalls with inclined ramps at either side of the reflector for guiding an oncoming snowplow blade over the reflector without damaging contact, and securing surfaces extending longitudinally along the body parallel to one another and projecting downwardly into complementary grooves in the pavement, the securing surfaces preferably lying on downward extensions of the sidewalls and perpendicular to the roadway surface. Auxiliary surfaces may be provided adjacent the inclined ramps and parallel to the roadway surface for resting upon the roadway surface and providing increased resistance to downward movement of the body when the inclined ramps are contacted by a snowplow blade. In addition, the downward extensions may terminate in a series of steps which follow a generally arcuate path so that the grooves in the pavement may be arcuate, but the steps will resist rocking movement of the extensions in the grooves.

3,587,417

EXPOSURE DEVICE FOR MANUFACTURING PICTURE SCREENS FOR CATHODE-RAY TUBES INTENDED FOR THE DISPLAY OF COLOR SCENES

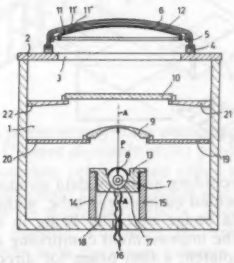
Jan Jacob Balder; Johannes Rijnders, and Johannes Aloysius Van Leeuwen, Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 22, 1968, Ser. No. 769,668

Claims priority, application Netherlands, Nov. 11, 1967, 6715342

Int. Cl. G03b

U.S. Cl. 95—1 **9 Claims**



An exposure device for projecting aperture patterns from a mask onto a photosensitive layer on a carrier used in manu-

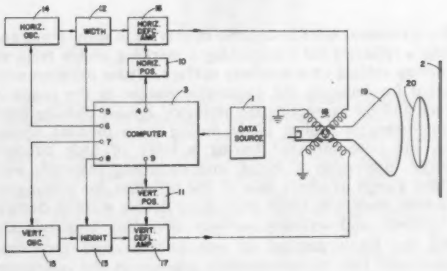
facturing picture screens of cathode-ray tubes. The portions of the photosensitive layers exposed to light harden while unexposed portions do not, and are therefore more easily removable. In the form shown, the device comprises an elongated lamp, a lens for correcting differences between light and electron radiation sources, and an intermediate member having an elongated aperture positioned between the lamp and the lens with the longitudinal axis of the aperture orthogonal to the longitudinal axis of the lamp. Concave, cylindrical mirrors are used to reflect the light so that the actual width of the lamp is effectively increased.

3,587,418

ARRANGEMENT FOR FORMING CODE MARKS

Asger T. Nielsen, El Cajon, and Donald R. Brewer, La Mesa, Calif., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 26, 1968, Ser. No. 724,432
Int. Cl. G03b *17/24*
U.S. Cl. 95—1.1 **6 Claims**



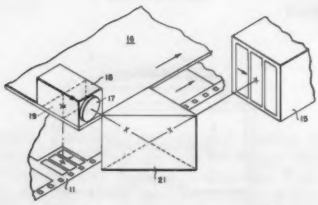
Rectangular code marks are formed on a photosensitive medium such as a photographic film or xerographic plate or web by exposing the medium to a cathode-ray tube. The marks are displayed on the cathode-ray tube by forming Lissajous-type patterns and letting them run within the constraint of the dimensions of the rectangle to be formed. If the two frequencies are separated by nonintegral multiples, the Lissajous-type patterns will quickly fill the rectangle, at which time a new pattern may be initiated.

3,587,419

DEVICE FOR RECORDING DATA ON FILM

Donald F. Blazek, Bensenville; Elmer J. Bury, Wheaton; Robert W. Moore, Glendale Heights, and Oliver J. Smith, Crystal Lake, Ill., assignors to the United States of America as represented by the Secretary of the Navy

Filed Oct. 22, 1968, Ser. No. 769,585
Int. Cl. G03b *17/24*
U.S. Cl. 95—1.1 **1 Claim**



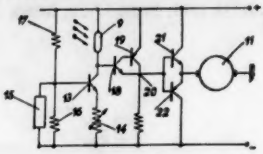
A device for recording auxiliary data on moving film from a stationarily mounted cathode-ray tube, without skewing of the recorded data image said film being in contact with a movable platen, the improvement comprising a lens attached to said movable platen, a first prism for directing an image from said cathode-ray tube through said lens and a second prism for directing said image from said lens onto said moving film.

3,587,420

AUTOMATIC CAMERA DIAPHRAGM SYSTEM

Helenio Llop, Creteil, France, assignor to Societe D'Optique Precision, Electronique Et Mecanique "Soplem", Paris, France

Filed Sept. 13, 1967, Ser. No. 668,299
Claims priority, application France, Sept. 20, 1966, 76,907
Int. Cl. G03b *7/10, 19/18*
U.S. Cl. 95—10C **2 Claims**



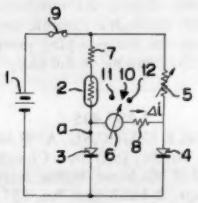
An automatic camera diaphragm control uses a photo resistant cell which receives light through the diaphragm. The cell is supplied with an adjustable constant current. An overall sensitivity results which is independent of nominal illumination and which depends solely on the relative variations of illumination.

3,587,421

ELECTRIC EXPOSURE METER

Shigeo Ono, Yokohama-shi, and Ichiro Hamaguchi, Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed July 10, 1968, Ser. No. 743,882
Claims priority, application Japan, July 20, 1967, 42/46357
Int. Cl. G01j *1/44;* **G03b** *7/04*
U.S. Cl. 95—10 **7 Claims**



An electronic exposure meter is disclosed that provides an indication of the amount of over and underexposure with a matched pointer type of meter. This is accomplished by connecting a meter across one diagonal of a bridge circuit to sense the balance thereof. The bridge circuit generally comprises a photoconductor and a diode series connected across a power source, a variable resistor and a second diode, also series connected across the current source and in parallel with the first series circuit, and the meter connected between the junctions of the series circuits.

3,587,422

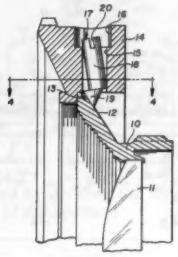
COUPLING DEVICE FOR A CAMERA

Alfred Kilgus, Stuttgart-Wangen, Germany, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 16, 1968, Ser. No. 745,158
Claims priority, application Germany, July 29, 1967, P 16 50 977.6
Int. Cl. G03b *19/00*
U.S. Cl. 95—11 **18 Claims**

A device for coupling a pair of movable members, particularly a pair of concentrically oriented, rotatable members, includes a stud having a cylindrical main portion rotatably mountable in one of the members and a conical eccentric portion fixed to the cylindrical main portion for rotation with the main portion to a position of coupling engagement with the other of the members. In the illustrated embodiment, the one member is the setting ring and the other member is the

lens barrel of a photographic or cinematographic camera. The stud is receivable in a radial, smooth-bored hole in the setting ring, and the cylindrical main portion is skewed in the hole when the conical eccentric portion is rotated to a position of coupling engagement with a mating surface on the



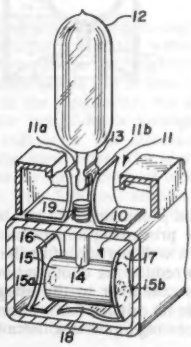
lens barrel. The stud is preferably made of an elastic plastic material, so that the conical eccentric portion is deformable by serrations on the mating surface of the lens barrel to prevent accidental reverse rotation of the stud and consequent uncoupling of the two members.

3,587,423

DEVICE FOR AUTOMATICALLY CLEANING ELECTRICAL CONTACT SURFACES IN PHOTOGRAPHIC APPARATUS

Horst Simon, Stuttgart-Wangen, Germany, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 16, 1968, Ser. No. 753,104
Claims priority, application Germany, Dec. 8, 1967, K59653
Int. Cl. G03b *19/00*
U.S. Cl. 95—11 **9 Claims**



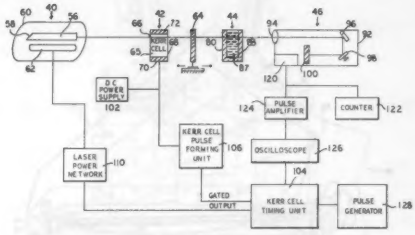
In photographic apparatus such as a still picture or moving picture camera, a device for automatically cleaning the connected surfaces of an installed electrical cell and mating circuit contacts utilizes an actuating member that extends into the cell holder for engagement with either the cell itself or one of the mating contacts and which is movable to effect relative movement between the cell and at least one of the contacts in response to the positioning of an associated member, such as a flashbulb, flashcube, or film magazine, in operative relation to the apparatus, or in response to the performance of some other function that is a prerequisite to the proper operation of such apparatus.

3,587,424

LASER CAMERA AND DIFFUSION FILTER THEREFOR

T. O. Paine, Deputy Administrator of the National Aeronautics and Space Administration in respect to an invention of, and Mark J. Olsasky, Woodland Hill, Calif.

Filed Aug. 20, 1968, Ser. No. 753,974
Int. Cl. G03b *41/14;* **H01s** *3/00*
U.S. Cl. 95—11 **9 Claims**



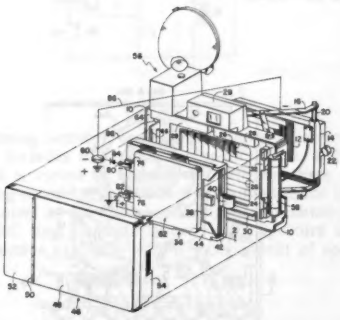
A laser camera system including a diffusion filter is disclosed. The diffusion filter is a laser light transparent receptacle containing a suspension of small particles having an average diameter larger than the wavelength of the laser light. The suspension is preferably a colloidal suspension of milk or metal particles in water.

3,587,425

POWER SUPPLY FOR A PHOTOGRAPHIC CAMERA

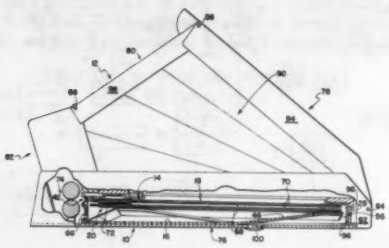
Conrad H. Biber, Needham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 18, 1969, Ser. No. 886,126
Int. Cl. G03b *37/02*
U.S. Cl. 95—11 **20 Claims**



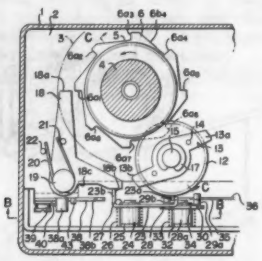
An electrical power supply for a photographic camera and its accessories. Current demands of the photographic system are met by a secondary cell mounted within the basic camera structure. The secondary cell is rechargeable during a picture taking sequence by a primary battery incorporated with a disposable film cassette. Following the exhaustion of film within the cassette, both the empty cassette and the primary recharging battery are disposed of. A diode or the like is inserted within the interconnecting circuitry of the batteries in order to prevent a backdrain of charge from the secondary battery.

3,587,426
PHOTOGRAPHIC FILM ASSEMBLAGE
Irving Erlichman, Natick, Mass., assignor to Polaroid Corporation, Cambridge, Mass.
Continuation-in-part of application Ser. No. 693,966, Dec. 27, 1967, now abandoned. This application Mar. 18, 1968, Ser. No. 713,648
Int. Cl. G03b 17/50
U.S. Cl. 95—13 6 Claims



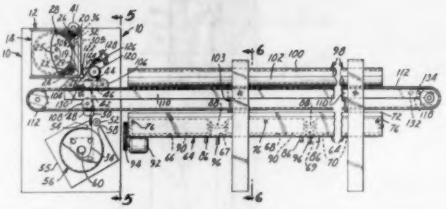
A photographic film assemblage including a container housing a plurality of film units including an end wall with a slot through which the film units are withdrawn, and a sheet of opaque material for preventing exposure of the film units by light admitted through openings in the container and the withdrawal of more than one film unit at a time through the slot.

3,587,427
FILM ADVANCE AND SHUTTER CHARGING DEVICE FOR USE IN 16 MM. CAMERAS
Yoshio Nitta, Osaka, Japan, assignor to Minotta Camera Kabushiki Kaisha, Minami-Ku, Osaka, Japan
Filed Apr. 18, 1968, Ser. No. 722,256
Claims priority, application Japan, Apr. 21, 1967, 42/25594
Int. Cl. G03b 1/62, 9/68
U.S. Cl. 95—31AC 4 Claims



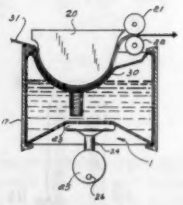
A device is provided for stopping the winding rotation of a film cartridge and for charging a shutter, for use in small-sized photographic cameras such as a 16 mm. photographic camera, and wherein the winding of the film, its stopping, and the charging of the shutter are performed by a film winding knob which is rotatable only in one direction. The stopping operation of the film winding and the shutter charging operation are registered by a register cam rotatable through an angle which is a divisor of 360°, in cooperation with the film winding knob which is rotated for a given angle for winding the predetermined length of the film.

3,587,428
ROLL FILM PROCESSOR AND PROCESSING METHOD
Paul J. Good, Springwater, N.Y., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Sept. 26, 1968, Ser. No. 762,774
Int. Cl. G03d 3/00, 3/16
U.S. Cl. 95—94 11 Claims



Apparatus and method for processing a length of film contained in a magazine while one end of the film is retained in the magazine in which the film is threaded from the magazine onto a takeup reel, the film extending between the magazine and the takeup reel is moved to a loop path through a film processor and the film is processed and rewound into the magazine.

3,587,429
INTEGRAL PROCESSING TRAY AND LIQUID CONTAINER
John E. Morse, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Nov. 6, 1968, Ser. No. 773,771
Int. Cl. G03d 13/04
U.S. Cl. 95—95 3 Claims

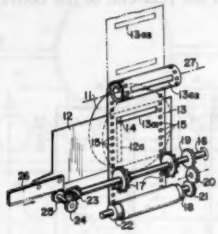


A combination processing tray and liquid container for use in photographic processing apparatus. The combination unit is formed with a wall portion of resilient material which can be deformed to reduce the container volume thereby forcing liquid from the container to the integral tray. As the container returns to its original form during each processing cycle, excess processing liquid is withdrawn into the container.

3,587,430
MULTIPHOTOGRAPHIC DEVICE
Yoshio Fukushima, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan
Filed Sept. 19, 1968, Ser. No. 760,771
Claims priority, application Japan, Sept. 29, 1967, 42/62808
Int. Cl. G03b 19/18
U.S. Cl. 95—37 5 Claims

A multiphotographic device is provided having a first lens with an associated movable aperture adapted to record a plurality of images by means of a movable aperture and a plurality of microlenses. The movable aperture is formed by superimposing a slot in a vertically moving belt on a slot in a horizontally movable plate. The vertical belt is moved in in-

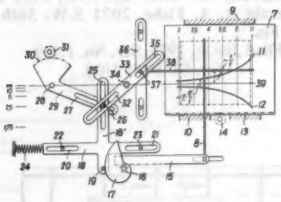
crements slightly larger than the size of the aperture, and the horizontal plate is moved in increments equal to $1/n$ where n is the quotient obtained by dividing the length of the slot by the length of one side of the aperture.



3,587,431
ARRANGEMENT FOR INDICATION OF THE ZONE OF SHARPNESS

Hermann Holler, Vienna, Austria, assignor to Karl Vockenhuber, Vienna, Austria and Raimund Hauser, Vienna, Austria

Filed May 20, 1969, Ser. No. 826,238
Claims priority, application Austria, May 22, 1968, A4943/68
Int. Cl. G03b *3/00*
U.S. Cl. 95—44 **31 Claims**



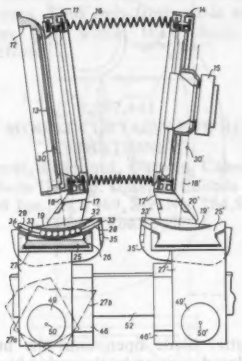
A camera having an objective and focusing mechanism for the objective. A diaphragm is situated within the objective and is adjustable with respect to the brightness of the scene to be taken. A viewfinder system and at least first and second indicators are visible in the viewfinder. An adjusting device for at least one of the indicators is arranged to vary the distance between the indicators. The distance defines a section of line visible in the viewfinder. The section of line corresponds to a perspective reproduction of a fictitious section of line of known size. The fictitious section of line is supposed to be situated on one of the limits of the depth of field. A calculating mechanism is provided for computing the depth of field and the length of the distance from a given set of values and controlling the adjusting mechanism accordingly. The values determine at least one limit of the depth of field and comprise at least the diaphragm aperture and the setting of the focusing mechanism.

3,587,432
PHOTOGRAPHIC CAMERA

Carl Koch, Schaffhausen, Switzerland, assignor to Sinar AG Schaffhausen, Feuerthalen, Switzerland

Filed Aug. 16, 1968, Ser. No. 753,100
Claims priority, application Switzerland, Sept. 6, 1967, 12470/67
Int. Cl. G03b *5/06, 5/08*
U.S. Cl. 95—50 **13 Claims**

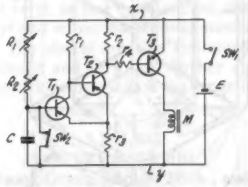
A photographic camera having a base, a photosensitive material carrier and a lens carrier each adjustably coupled by means of holders in the camera base with both carriers coupled to a movable bearing member, the bearing members being movable for pivotal adjustment on the holders and the carriers are coupled to the respective bearing members by means of a rotary joint which defines a swing axis, and the bearing members are coupled to the associated holder for movement relative to the holder along respective arcuate bearing surfaces having centers of curvature lying on a common line which is on the side of the rotary joint remote from the camera base and defines a tilt axis.



3,587,433
CAMERA SHUTTER TIMING MECHANISM

Kintaro Yata, Ikeda, Japan, assignor to Minolta Camera Co., Ltd., Osaka, Japan

Filed Nov. 16, 1967, Ser. No. 683,501
Claims priority, application Japan, Nov. 18, 1966, 41/75875
Int. Cl. G03b *9/64*
U.S. Cl. 95—53 **6 Claims**



An RC timing network controls the timing of a lens-type shutter and includes in series a timing capacitor, a first resistor which is varied to control the exposure time and a compensating second resistor which is coupled to the shutter aperture control to vary the second resistor resistance and hence the RC time constant directly with aperture size so that the effective exposure time is independent of aperture size.

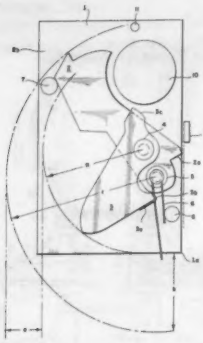
3,587,434
SHUTTER FOR PHOTOGRAPHIC CAMERA

Wolfgang Ort, Stuttgart-Bad, Cannstatt, Germany, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 25, 1968, Ser. No. 747,590
Claims priority, application Germany, Aug. 5, 1967, K63-047
Int. Cl. G03b *9/16*
U.S. Cl. 95—59 **6 Claims**

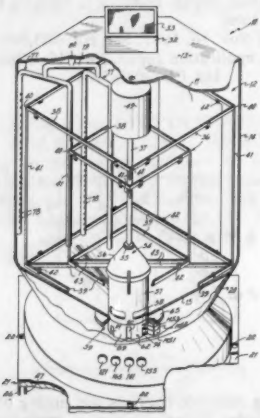
A shutter mechanism for a photographic camera includes a pivotable impact shutter blade and an inertial mass pivotally mounted on the shutter blade for movement therewith and for pivotal movement relative thereto. For fast shutter speeds both the shutter blade and the inertial mass move a certain distance limited by a stop to open the aperture and then return by a spring bias to their closing positions. For a slow shutter speed the shutter blade opens the same limited

distance but the inertial mass is permitted to continue its movement about its pivot connection to the shutter blade,



holding the shutter blade open until the inertial mass is returned to its closed position by the spring bias.

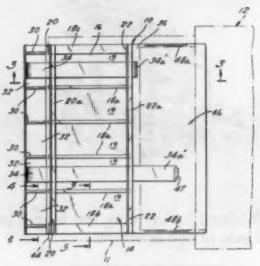
3,587,435
FILM PROCESSING MACHINE
Pat P. Chioffe, 319 Commonwealth Ave., Erlanger, Ky.
Filed Apr. 24, 1969, Ser. No. 819,010
Int. Cl. G03d *5/04*
U.S. Cl. 95—93 **10 Claims**



A film processing machine particularly adapted for developing X-ray film characterized in that the entire developing process is carried out within a single chamber and that the processing solutions are sequentially applied to the film by spraying. The preferred embodiment of the machine includes a plurality of rotatable racks positioned in nesting relation within the chamber, each rack carrying suitable grippers from which the film is hung. As the racks rotate the film is passed between spray heads which apply the film processing solutions in the required sequence, the spray excess draining by gravity into a selectively positionable directional cup to recycle the processing solutions either to tank or to waste.

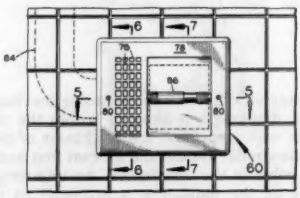
3,587,436
FILM FEED APPARATUS
Robert Nast, 942 Glenridge Ave., North Woodmere, N.Y.
Filed Aug. 13, 1968, Ser. No. 752,382
Int. Cl. G03d *3/12*
U.S. Cl. 95—94 **7 Claims**

A photographic film feed adapter for simultaneously feeding a plurality of exposed filmstrips to automatic film processing equipment, which includes a tray having its top surface divided into parallel tracks for slidable conveyance of filmstrip therealong from the front to the rear end of the tray, and film roll receptacles at the rear of the tray. A carrier sheet is disposed at the rear end of the conveyor tracks and



the leading ends of the filmstrips are detachably secured to the carrier sheet which conveys the filmstrips through the film processing equipment in alignment with the tracks. A reel adapter may be detachably coupled to the front of the tray for accommodating reels of film.

3,587,437
COMBINATION PAPER DISPENSER AND EXHAUST VENTILATOR
Norman S. McEwen, 437 N.E. 8th Ave., Fort Lauderdale, Fla., and Gerald R. A. Fishe, 2031 S.W. 36th Ave., Fort Lauderdale, Fla.
Filed Jan. 8, 1970, Ser. No. 1,469
Int. Cl. F24f *5/00*
U.S. Cl. 98—1 **6 Claims**

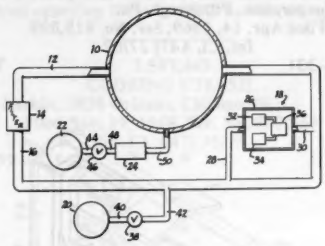


A ventilated paper dispenser wherein a paper roll holder is mounted in a shell having an open front and an air inlet is provided at one side of the open front other than the bottom side and leads to a connector through which a ventilating device may be connected.

3,587,438
GASEOUS ATMOSPHERE CONTROL DEVICE
Donald L. Foster, and Lenord Williams, Birmingham, Mich., assignors to Space/Defense Corporation, Birmingham, Mich.
Continuation of application Ser. No. 585,998, Sept. 21, 1966, now abandoned which is a continuation-in-part of application Ser. No. 353,983, Mar. 23, 1964, now abandoned. This application May 3, 1968, Ser. No. 726,605
Int. Cl. B64d *13/04*
U.S. Cl. 98—1.5 **23 Claims**

A control system for maintaining the composition and pressure of a gas mixture including oxygen at a predetermined total pressure in a chamber and simultaneously maintaining the partial pressure of at least the oxygen at a predetermined level relative to the total pressure of the mixture. The control system is capable of preferentially supplying oxygen from a source to the chamber whenever the ox-

ygen partial pressure is below the predetermined level and supplying a second gas from a source when the total pressure

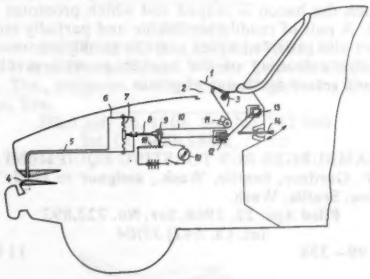


is below the predetermined level while the oxygen is at the predetermined partial pressure level.

3,587,439
AUTOMOTIVE AIR-VENT AUTOMATIC CONTROL SYSTEMS

Jacques Mercier, Billancourt, France, assignor to Regie National Des Usines Renault, Billancourt (Hauts de Seine), France and Automobiles-Peugeot, Paris, France

Filed Jan. 10, 1969, Ser. No. 790,390
Claims priority, application France, Jan. 23, 1968, 137,074
Int. Cl. B60h *1/24*
U.S. Cl. 98—2 **7 Claims**

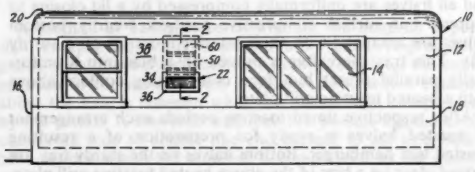


A device for automatically controlling the movable louvre of an air vent in a ventilation system of an automotive vehicle, wherein said louvre is controlled by means of a mechanical transmission connected to the movable member of a vacuum cylinder of which the suction chamber communicates with the suction orifice of a Venturi tube having its convergent small section directed towards the relative wind.

3,587,440
AIR FILTERING DEVICE FOR BUSES AND THE LIKE

Raymond B. Giudici, 7308 Filbert Ave., Orangevale, Calif.

Filed May 28, 1969, Ser. No. 828,635
Int. Cl. B60h *1/24*
U.S. Cl. 98—2.01 **3 Claims**

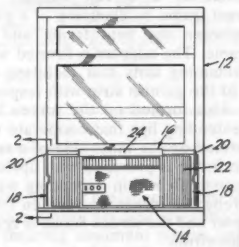


The device provides an air duct through which filtered air is admitted to the interior of a bus and prevented from flowing from the bus. This takes advantage of the tendency of buses, trailers, campers, etc. to weave while in motion to cause a bellowslike effect which tends to draw in dusty air through cracks and crevices, the device thereby admitting only fresh air into the vehicle while the tendency of the latter to exhaust air causes such air to be discharged through cracks and crevices. Thus only fresh air is admitted to the vehicle and any dust within the vehicle tends to be discharged therefrom.

3,587,441
WINDOW MOUNT CURTAINS FOR ROOM AIR CONDITIONER

Norman W. Woods, Brantford, Ontario, Canada, assignor to Keeprite Products Limited, Ontario, Canada

Filed Jan. 28, 1969, Ser. No. 794,593
Int. Cl. E06b *7/02*
U.S. Cl. 98—94 **11 Claims**

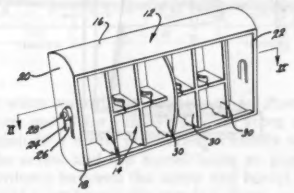


An accordion-type curtain for a window mount air conditioner to close the space between the air conditioner and a window frame wherein the curtain comprises two sheets made of vinylchloride polymers and having hinge lines formed by dielectric heating and wherein at least one of the sheets is a rigid vinyl. In one embodiment, the other sheet is also a rigid vinyl and in another embodiment the other sheet is a soft vinyl. The sheets are also laminated together in a further embodiment and in a still further embodiment the sheets are fastened together only at the hinge lines.

3,587,442
LOUVER ASSEMBLY

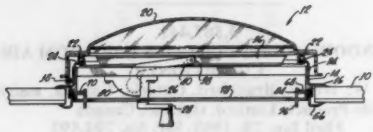
Gerald V. Jakeway, Grand Rapids, Mich., assignor to Keeler Brass Company, Grand Rapids, Mich.

Filed Mar. 13, 1969, Ser. No. 806,805
Int. Cl. F24f *13/00*
U.S. Cl. 98—110 **13 Claims**



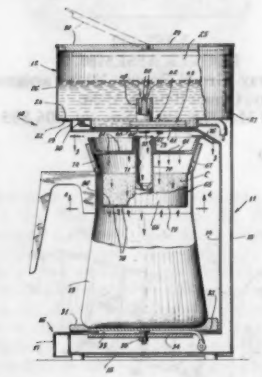
The disclosure relates to a louver assembly for air conditioning and the like. The assembly has a housing which rotatably supports a plurality of vanes in parallel alignment. Each vane has a cam surface which abuts against an adjacent cam so that each vane rotates in unison when one of the vanes is moved. The sides of the housing have resiliently mounted journals for rotatably supporting the louver assembly in an end of a duct.

3,587,443
VENT SCREEN ASSEMBLY
Jerry Rapport, Long Beach, Calif.
Filed Oct. 15, 1969, Ser. No. 866,498
Int. Cl. F24f 7/02
U.S. Cl. 98—114 12 Claims



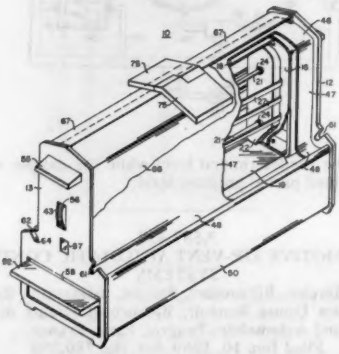
A vent frame provided with a vent cover has a vent screen assembly that includes a screen adapter conveniently mounted to the vent frame by clamping of a pair of adapter retaining tabs between the vent frame and a structural member of the frame. The adapter is formed with a number of garnish strip retaining slots that facilitate accurate and close positioning of the garnish strip with respect to the vent screen assembly. Also formed on the screen adapter are a pair of inwardly extending lips that cooperate with a pair of latch members formed on the inner side of a resilient screen frame. The screen frame is provided with upstanding flanges that closely and snugly fit within depending wall portions of the adapter, whereby the screen and screen frame precisely fit within the adapter and the screen frame is readily attached to and removed therefrom.

3,587,444
DRIP TYPE COFFEE MAKER
Siegfried Godel, Norwalk, and Lester F. Miller, Bethel, Conn., assignors to Sperry Rand Corporation, New York, N.Y.
Filed Nov. 26, 1969, Ser. No. 879,987
Int. Cl. A47j 31/00
U.S. Cl. 99—282 11 Claims



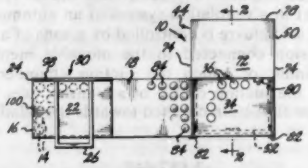
A coffee maker for brewing drip type coffee comprising a water supply reservoir disposed over a coffee server with a coffee basket arranged therebetween. Means are provided for dividing water received therein sequentially into two volumes with thermoresponsive value means provided for releasing sequentially one volume directly to the coffee server at one preselected temperature and the other volume to the coffee basket at a second preselected temperature for later recombination with the first volume in the coffee server.

3,587,445
ELECTRICALLY OPERATED FOOD COOKER
Paul J. Kircher, Mansfield, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Apr. 14, 1969, Ser. No. 815,899
Int. Cl. A47j 27/62
U.S. Cl. 99—331 7 Claims



A cooking appliance suitable for, but not limited to, the cooking of bacon. The appliance is characterized by the provision of a removable, generally U-shaped cooking plate over which the bacon is draped and which promotes grease drainage. A pair of readily removable and partially mounted covers are also provided which serve to readily accommodate loading the unloading of the cooker as well as cleaning thereof and retard spattering of grease.

3,587,446
HAMBURGER BUN TOASTING EQUIPMENT
Leonal P. Gardner, Seattle, Wash., assignor to Herfy's Corporation, Seattle, Wash.
Filed Apr. 22, 1968, Ser. No. 722,897
Int. Cl. A47j 37/04
U.S. Cl. 99—339 11 Claims

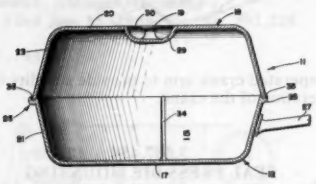


Equipment is provided to uniformly toast hamburger buns requiring only one "setting" of top and bottom halves of buns during nearly simultaneous multiple preparation of hamburgers during a specific cooking run. Top halves are arranged with their interior face down on a heated toasting grill and all halves are uniformally compressed by a lid closing to a preset bun surface compressive position. Nearby, bottom halves are arranged with their interior faces up on a sturdy tray. This tray thereafter is moved on a bias into a uniformally parallel preset bun face compressing contact above with a heated toasting grill plate.

After respective timed toasting periods each arrangement of toasted halves is ready for preparation of a resulting toasted bun hamburger. Bottom halves on the sturdy tray are moved clear on a bias of the above heated toasting grill plate. Top halves are moved to hamburger patties on an adjacent cooking grill. Respective combined top halves and hamburger patties are transferred as a "handling unit" to bottom halves completing a tray full of "ready to serve" hamburgers.

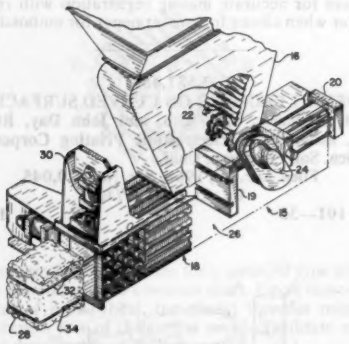
Selectively, during this "minimal handling" of the principal components, i.e. two bun halves and the meat pattie, onions, relish and dressings are added in accordance with specific orders without upsetting these minimal bun handling steps.

3,587,447
COOKING UTENSIL
Dennis J Larkin, 1838 Orleans, Chicago, Ill.
Filed Nov. 19, 1968, Ser. No. 777,063
Int. Cl. A47j *36/16*
U.S. Cl. 99—425 9 Claims



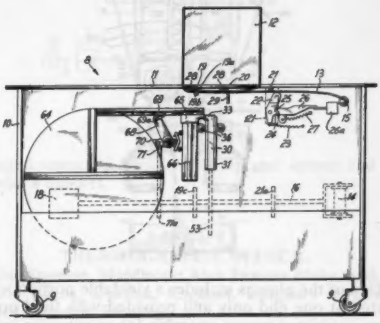
To obtain a tight fit between a disposable liner of metallic foil, plastic or other material and a cooking pan, a cover for the pan is formed to function as a male die for insertion, when inverted, into the pan to force the liner tightly against the pan.

3,587,448
METHOD OF BALING MATERIAL
Charles Wayne Hemphill, and Werner Peter Goldkuhle, Lubbock, Tex., assignors to Concentric Engineering Company, Dallas, Tex.
Filed July 26, 1968, Ser. No. 747,900
Int. Cl. B65b *13/02, 13/30*
U.S. Cl. 100—3 4 Claims



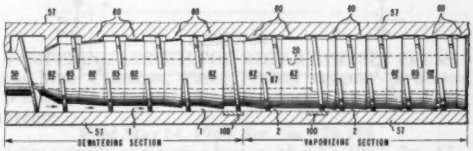
A method of baling material wherein the material is partially compressed as it is forced into a tunnel. A reciprocating piston slidably received within the tunnel completes the compression of the material into a bale. A band which extends about the bale is fastened while the bale is held compressed by the piston. A movable wall member presses against each completed bale to enable one end thereof to act as a bulkhead against which the material is compressed by the piston as a new bale is formed within the tunnel. A passageway formed in the piston face enables a band fastening device to pass between the piston face and a previously formed bale in order to fasten the band while the bale is maintained compressed by the piston.

3,587,449
APPARATUS FOR APPLYING LOCKING SLEEVES TO TYING MATERIAL
Edgar Meckler, Radevormwald, Germany, assignor to Bruninghaus & Co. Bezett KG, Wuppertal-Wichlinghausen, Germany
Filed Oct. 7, 1968, Ser. No. 765,333
Claims priority, application Germany, Oct. 7, 1967, P 15 86 509.5
Int. Cl. B65b *13/34*
U.S. Cl. 100—30 15 Claims



Locking sleeve blanks are successively fed to a position located between a stationary first shearing abutment means and a second shearing abutment means on a movable arm which also carries a pair of jaws for closing the blanks. When the leading blank is advanced to the second shearing abutment means located between the jaws, the arm is moved toward overlapping portions of a tying material surrounding a package so that the blank is severed and embraces the tying material, whereupon the jaws are closed to form the blank into a locking sleeve about the overlapping portions of the tying material.

3,587,450
SCREW PRESS FOR DRYING ELASTOMERIC MATERIALS
Stanley G. Smith, Beaumont, Tex., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed Sept. 13, 1968, Ser. No. 759,727
Int. Cl. B30b *9/12*
U.S. Cl. 100—117 3 Claims

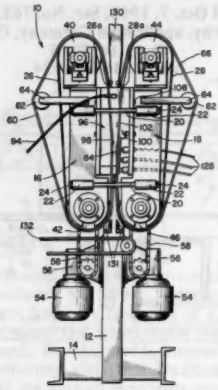


In the water-vaporizing section of an open-barrel screw press dryer, useful for removing water from elastomers, the combination of a screw positioned coaxially within a slotted barrel, the screw and the barrel being so proportioned that the free volume between the screw and barrel is from 8 to 18 percent of the total available barrel volume.

3,587,451
PRESS HAVING ADJUSTABLE PLATEN LOADING
Oscar Luthi, Nashua, N.H., assignor to Improved Machinery, Inc., Nashua, N.H.
Filed Feb. 19, 1969, Ser. No. 800,491
Int. Cl. B30b *9/24*
U.S. Cl. 100—118 10 Claims

A press having a processing chamber bounded on two opposing sides by drive belts which are caused to longitudinally

converge by opposed platens whereby the processing chamber is of diminishing side-to-side dimension. Filter belts overlay the drive belts and are driven longitudinally through the processing chamber thereby, the filter belts being tensioned to assume the converging relationship of the drive



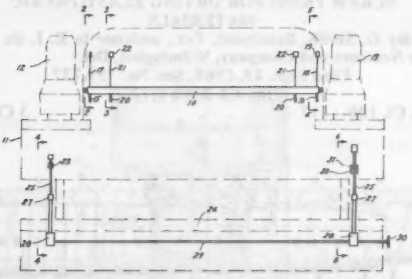
belts. One of the platens includes a yieldable portion which is supported at one end only and provided with fluid operated cylinder-and-piston means operable for causing the yieldable portion to vary the angle at which the adjacent drive belt extends towards the other thereof for varying the pressing force on material in the processing chamber.

3,587,452

LEVELING CONTROL FOR A PRESS

Eric George Krause, Osborne Park, Australia, assignor to Nova Machinery Pty. Ltd., Osborne Park, Australia

Filed Nov. 8, 1968, Ser. No. 774,358
Claims priority, application Australia, Nov. 15, 1967, 29833/67
Int. Cl. B30b *15/24*
U.S. Cl. 100—256 **5 Claims**



A levelling control for a press having a moveable platen operated by a pair of hydraulic rams wherein an elongated torsion tube is mounted with its longitudinal axis horizontal on the moving platen and operatively associated with means to control the supply of hydraulic fluid to said rams in response to twisting of the torsion tube about its longitudinal axis.

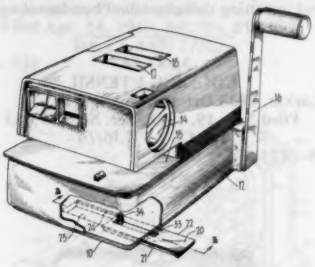
3,587,453

STABILITY FOR HAND OPERATED POSTAGE METER

Richard G. Klein, San Lorenzo; Sheldon E. Thorson, Pleasanton, and John C. Morris, Castro Valley, Calif., assignors to The Singer Company

Filed Feb. 17, 1969, Ser. No. 799,840
Int. Cl. F16f *15/02;* **F16m** *11/22*
U.S. Cl. 101—1 **1 Claim**

An outrigger device is adjustable within the base of a postage meter from a normally inoperative to an operative position. In its operative position, the outrigger or slidable meter support extends transversely of the plane of motion of



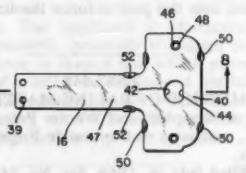
the hand operated crank arm to provide stability to the meter during operation of the crank.

3,587,454

SEAL PRESS DIE MOUNTING

John W. Meyer, Glenview, and Ralph J. Steiner, Chicago, Ill., assignors to Meyer & Wenthe, Inc., Chicago, Ill.

Filed May 22, 1969, Ser. No. 826,840
Int. Cl. B44b *5/02*
U.S. Cl. 101—3 **8 Claims**



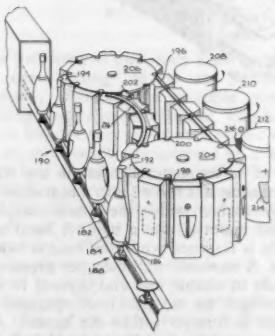
A seal press having a unitized die assembly wherein one of the dies is spring mounted by a blade spring for mating relationship with the other die and both dies are rotatable for paper orientation. The mounting is improved in structure and assembly to assure in production close clearances and coincident axes for accurate mating registration with respect to each other when closed to contact paper for embossing.

3,587,455

OFFSET PRINTING ON CURVED SURFACES

Clyde O. Childress, Palo Alto, and John Day, Richmond, Calif., assignors to Electrostatic Printing Corporation of America, San Francisco, Calif.

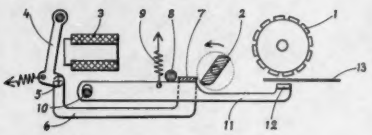
Filed Apr. 10, 1968, Ser. No. 720,045
Int. Cl. B41f *17/30*
U.S. Cl. 101—35 **19 Claims**



A print is made of an object having a surface with a considerable contour variation by first printing the image on an

intermediate carrier surface which is capable of being deformed in such a manner that it will envelop the required area of the surface upon which printing is to be done without wrinkling and without allowing relative movement or sliding between the object surface and transfer surface as they are brought into conforming contact and then separated. The image may be transferred from the intermediate carrier surface either by the application of an electric field while the intermediate carrier and the object are in contact, or by applying a thin layer of a suitable liquid to the object surface prior to applying the intermediate carrier thereto.

3,587,456
HIGH SPEED PRINT HAMMER CONSTRUCTION
Klaus H. Jaensch, Aldingen, Germany
Filed Jan. 15, 1969, Ser. No. 792,228
Int. Cl. B41j *9/28*
U.S. Cl. 101—93 **3 Claims**



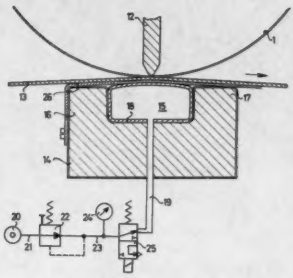
The present invention relates to an apparatus for numerically printing the results of computers, or measuring instruments with digital electrical output.

3,587,457
DETENT MEANS FOR DATER WHEELS
John C. Morris, Castro Valley, Calif., assignor to The Singer Company
Filed May 2, 1969, Ser. No. 821,365
Int. Cl. B41j *1/54*
U.S. Cl. 101—110 **3 Claims**

A self-contained detent means for a series of type wheels is removably supported on a common shaft. Upon removal and replacement of each wheel, the detent therefor remains in place to prevent loss of the detent and to facilitate easy assembly and disassembly of the apparatus.

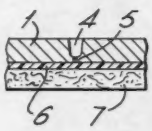
3,587,458
ROLLING CONTACT SCREEN PRINTING MACHINE WITH DEFORMABLE COUNTERPRESSURE MEMBER
Kurt Feier, Riednolz, and Hans Werthmuller, Utzensdorf, Switzerland, assignors to Fritz Buser AG, Maschinenfabrik, Wiler b. Utzensdorf, Switzerland
Filed Sept. 23, 1968, Ser. No. 761,417
Claims priority, application Switzerland, Aug. 29, 1968, Sept. 26, 1967, 908/68;13407/67
Int. Cl. B41f *15/08, 15/18*
U.S. Cl. 101—114 **5 Claims**

There is disclosed a rotary screen printing machine, the individual printing stations of which are equipped with a circular screen, beneath which passes the back cloth or printer's blanket with the material which is to be printed. According to the invention, a stationary counterpressure body member



is arranged vertically beneath the circular screen and below the printer's blanket.

3,587,459
THERMOGRAPHIC STENCIL
Alexander Spencer, Middlesex; Alan Francis Blake, and David Guthrie Burns, London, England, assignors to Gestetner Limited, London, England
Filed July 23, 1968, Ser. No. 746,890
Claims priority, application Great Britain, July 25, 1967, 34,075/67
Int. Cl. B41c *1/14*
U.S. Cl. 101—128.3 **8 Claims**

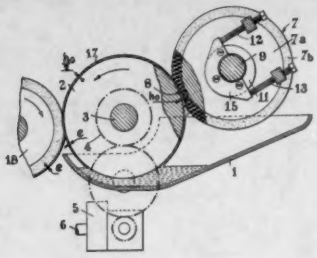


The invention provides a novel duplicating stencil comprising a backing sheet and attached to one edge thereof a thin sheet of thermoplastic film softening not above 250° C. carrying a multiplicity of minute, closely spaced holes or artificially weakened areas. In use a heat absorbent image to be copied is placed in contact with the thermoplastic film and the assembly is exposed to heat, and the holes enlarge or the artificially weakened areas perforate in the image areas.

3,587,460
DAMPENING SYSTEM FOR ROTARY OFFSET PRESS
Louis Jean Chambon, Paris, France, assignor to Societe D'Etudes De Machines Speciales, Societe Anonyme, Paris, France
Filed May 14, 1968, Ser. No. 729,118
Claims priority, application France, May 22, 1967, Dec. 13, 1967, 107233;132101
Int. Cl. B41l *23/04, 25/02*
U.S. Cl. 101—148 **7 Claims**

A dampening device for an offset-type rotary printing press in which a driven transfer roller, partially immersed in a dampening fluid, applies a film of dampening fluid to a driven dampened roller with which it coacts. A metering roller having a resilient and deformable surface coacts with the transfer roller with sufficient pressure between them to deform the metering roller inwardly so that the thickness of the film of dampening fluid is maintained uniform peripherally and axially of the transfer roller regardless of out-of-roundness of the transfer roller and flexure of the transfer and metering rollers. The device is provided with a drive that allows the driven dampened roller to drive the transfer roller variably in dependence upon changes of the thickness of the film of dampening fluid between the dampened roller and the transfer roller. The dampened roller will

vary the speed of the transfer roller so that it increases or decreases the thickness of the film of dampening fluid



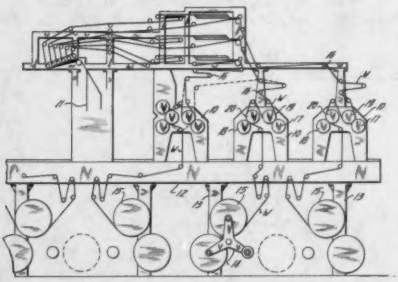
thereon as a function of its speed changes so that the film thickness is maintained constant automatically.

3,587,461

WEB THREADING DEVICE IN ROTARY PRINTING MACHINES

Burton C. Polglase, Scarsdale, N.Y., assignor to Wood Industries, Inc., Plainfield, N.J.

Filed July 8, 1968, Ser. No. 743,126
Int. Cl. B41f *13/04*; G03b *1/58*
U.S. Cl. 101—219 **3 Claims**



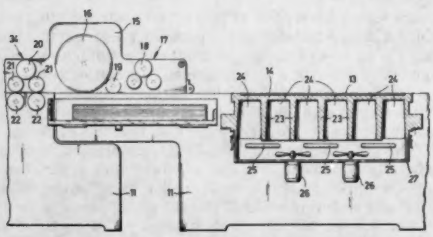
A device for threading a paper web into a newspaper printing machine unit. An auxiliary motor drive with overrunning clutches for the printing cylinder of the unit and for the pulling tapes of the web threading devices. Couplings for disconnecting the drive of the printing press unit cylinders from the main drive of the units of which the entire newspaper printing machine is composed.

3,587,462

TEMPERATURE-REGULATION FOR FLAT OFFSET PRESSES

Willy Hirsch, Buchackersiedlung, Gronau, Wurttemberg, Germany

Filed June 9, 1969, Ser. No. 831,667
Claims priority, application Germany, June 14, 1968, P 17 61 605.6
Int. Cl. B41f *3/52*
U.S. Cl. 101—287 **8 Claims**



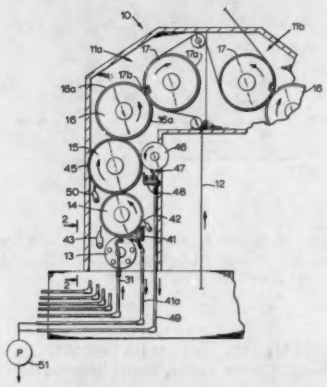
In a structure for regulating the temperature of beds of flat offset presses, supporting printing plates, the bed has an upwardly directed surface to be engaged by the printing plate and at its side directed away from said upper surface a plurality of strengthening ribs which intersect each other to form cells having open bottom ends. A temperature-regulating assembly coacts with said cells for regulating the temperature of the bed to maintain the latter at a uniform constant predetermined temperature. An enclosure is connected with said bed for enclosing the temperature-regulating structure.

3,587,463

SIMPLIFIED CIRCULATING INKING SYSTEM FOR ROTARY NEWSPAPER PRINTING PRESS

Wallace H. Granger, P.O. Box 157, Kentfield, Calif.

Continuation of application Ser. No. 650,453, June 30, 1967, now abandoned. This application May 18, 1970, Ser. No. 38,163
Int. Cl. B41f *31/06, 31/08*
U.S. Cl. 101—350 **7 Claims**



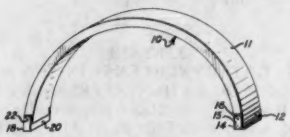
An improved inking system for rotary newspaper printing press employs a single inking cylinder with small cells in the surface thereof to continuously transfer a controlled amount of ink from a rotatable ink dispensing cylinder to a resiliently covered ink transfer cylinder that is in rolling contact with a printing cylinder. Excess ink is continuously removed from the inking cylinder and surplus ink is continuously removed from the ink transfer cylinder after contact with the printing cylinder for continuous return to a main storage tank or ink reservoir to be filtered and recycled. No vibrating drums or rollers are employed.

3,587,464

SADDLE MOUNTING FOR FLEXIBLE THIN PRINTING PLATES

Forrest Ashton Wessels, Baltimore, Md., assignor to W. R. Grace & Co., New York, N.Y.

Filed Sept. 26, 1968, Ser. No. 762,879
Int. Cl. B41f *27/14*
U.S. Cl. 101—415.1 **1 Claim**



The invention disclosed is directed to a method and mounting means for detachably mounting flexible thin printing plates. The printing plates are detachably mounted to a backing plate or saddle by means of a printing plate securing member is association with a wedge-shaped element disposed on at least one terminal edge of the backing plate or saddle.

The printing plate securing member is desirably pivotally mounted by arm members and includes an angularly disposed printing plate contacting surface for pressing a flexible thin printing plate against a mating edge of the wedge-shaped surface on at least one end of the saddle or backing plate.

3,587,465

MULTIPLE COPY PHOTOGRAPHIC SYSTEM

Richard F. Bartlett, Winchester, and Laura K. Case, Burlington, Mass., assignors to Itek Corporation, Lexington, Mass.

Filed May 14, 1968, Ser. No. 728,898
Int. Cl. B41n 3/02, 1/00
U.S. Cl. 101—457 11 Claims

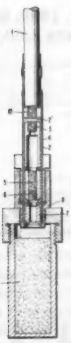
This disclosure relates to new offset printing masters which contain a supply of printing fluid thus permitting their use in multiple copying. The new masters obviate the need of frequent replenishment of the printing fluid. The new masters of this invention comprise crazed thermoplastic layers in which the extent of crazing permits retention of a supply of printing liquid in the thermoplastic layer. Various such masters are described in which the printing liquid is added from an external source or is present in the offset master and available for printing after crazing of the thermoplastic layer. Also described are masters which are especially suitable for use with oleophilic or hydrophilic printing liquids by virtue of the content therein of a layer of oleophilic or hydrophilic material made available to the crazed areas of the thermoplastic layer by the extent of crazing. Processes of multiple copying using the new offset printing masters are also described.

3,587,466

RELAY CHARGE WITH A FUSE OF WEAKENED EXPLOSIVE POWER

Josef Prior, Troisdorf, Germany, assignor to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Aug. 2, 1968, Ser. No. 749,879
Claims priority, application Germany, Aug. 2, 1967, D-53,738
Int. Cl. F42b 3/10
U.S. Cl. 102—27 10 Claims



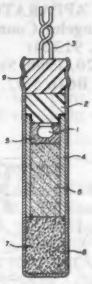
A relay charge for use with fuses in the initiation of insensitive explosives which comprises two parts preferably detachably connected with each other; one of the two parts contains secondary explosives within a structurally rigid case, open at one end while the other part forms a delay element which is connected with the open end of the case and serves for the accommodation of the fuse and of the delay charge. The delay element includes a shock-sensitive primer composition, a delay charge and a base charge, appropriately encapsuled within a casing.

3,587,467

DELAYED ACTION DETONATOR

Helmut Menke, and Hans Florin, Troisdorf, Germany, assignors to Dynamit Nobel AG, Troisdorf, Bezirk Cologne, Germany

Filed Aug. 16, 1968, Ser. No. 754,115
Claims priority, application Germany, Aug. 17, 1967, D53872
Int. Cl. F42b 3/12
U.S. Cl. 102—28 7 Claims



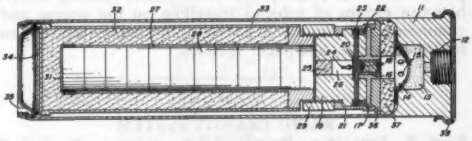
A safe delayed action detonator having an igniter, a delay composition and at least a primary explosive where the igniter and the delay charge are mixtures of silicon with either titanium, zirconium or both.

3,587,468

PHOTOFLASH CARTRIDGE HAVING DUAL FLASHES

Billy R. Bliss, Bedford, Ind.

Filed July 2, 1968, Ser. No. 742,972
Int. Cl. F42b 5/16
U.S. Cl. 102—32 3 Claims



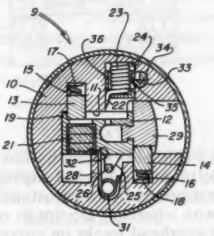
A photoflash cartridge having first and second inner containers coupled together and slidably positioned within a cartridge case, said first inner container containing a key flash composition which is first ignited and utilized as a signal for opening a camera shutter and said second inner container having a charge of photoflash composition which is ignited after said key flash composition is ignited to provide illumination for night aerial photography.

3,587,469

CENTRIFUGALLY ARMED ORDNANCE FUZE

Peter D. Gratton, Simpsonville, and James N. Ayres, Takoma Park, Md.

Filed Aug. 21, 1968, Ser. No. 754,501
Int. Cl. F42c 15/22
U.S. Cl. 102—79 5 Claims



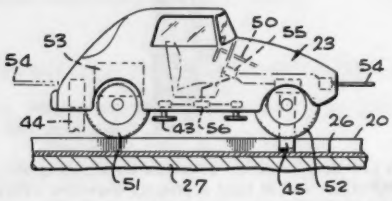
A centrifugally armed fuze having a spring-biased, spin-actuated stab detonator and a plasticized explosive booster

lead-in. Once armed at a first predetermined rotational velocity, an interdependent compound lever system, having two centrifugally responsive sears, restrains a spring-biased firing pin until the spin rate decays to a second (lower) predetermined rotational velocity. The sears bear against one another and one rests within a slot formed in the other to obtain mechanical advantage by leverage.

3,587,470
VEHICULAR TRANSPORTATION SYSTEM AND APPARATUS

Paul R. Wilson, Los Angeles County, Calif. (17830 Bahama St., Northridge, Calif. 91324)

Filed Mar. 20, 1968, Ser. No. 714,664
Int. Cl. B61b *5/02;* **B61l** *7/06*
U.S. Cl. 104—149 **12 Claims**

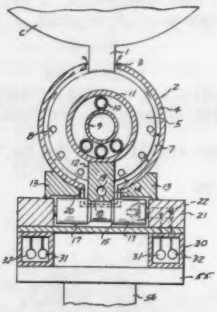


The vehicular transportation system and apparatus disclosed herein includes a main traffic conduit or course extending between population communities for automatically processing self-propelled passenger vehicles therealong and which is adapted to permit individual vehicles in controlled groups of the self-propelled passenger vehicles to selectively enter and exit the course by interchange means provided at predetermined locations along the length of the course. A pacer vehicle is employed to control the spacing intervals between groups of vehicles travelling on the course and a common power source is provided to supply motive power for the passenger and pacer vehicles.

3,587,471
RAPID TRANSIT SYSTEM

Kurt P. Schneider, Detroit, Mich., assignor to Jack W. Schneider, Taylor, Mich., fractional part interest

Filed May 12, 1969, Ser. No. 823,801
Int. Cl. B60v *3/04, 1/04*
U.S. Cl. 104—23FS **19 Claims**

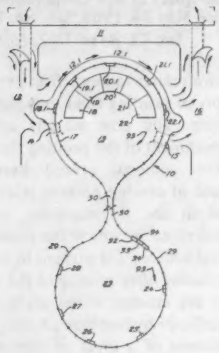


A projectilelike transport with a narrow runner projecting into a pneumatic tube and into the slightly recessed surface of rolls that are supported on hydrostatic bearings. Winged connector cars with wheels at the tips in special wheel housings that engage overhead tracks on curves. A flexible rapid transit system adaptable to subsurface or elevated sections of city or country side.

3,587,472
METHOD AND MEANS OF DESTINATION SORTING OF RAIL PASSENGERS

Ernest E. Bissett, 3616 Ontario Street, Vancouver 10, British Columbia, Canada

Filed June 4, 1969, Ser. No. 830,461
Int. Cl. B61b *1/00*
U.S. Cl. 104—27 **10 Claims**

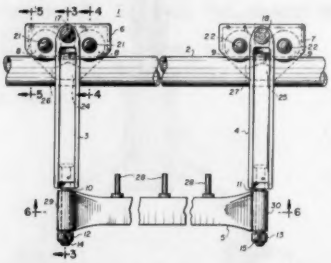


Method and means of destination sorting of passengers at a suburban parking area for rapid transit to downtown subway stations. Hydraulic totalizing counting means activating a bank of signals responsive to number of passengers and remaining train space, being placed at parking bay entrances and adjacent departure platforms. Totalizing by turnstiles before passengers reach platforms. Loop rail line configuration, cars coupled and uncoupled at speed providing nonstop transit of sorted passengers to particular destinations with only one train.

3,587,473
TROLLEY HANGER ASSEMBLY

Morton A. Weiss, Springfield, and Bernard S. Speckhart, Short Hills, N.J., assignors to White Machine Co., Kenilworth, N.J.

Filed Jan. 22, 1969, Ser. No. 793,037
Int. Cl. B61b *3/00;* **E01b** *25/22*
U.S. Cl. 104—93 **5 Claims**



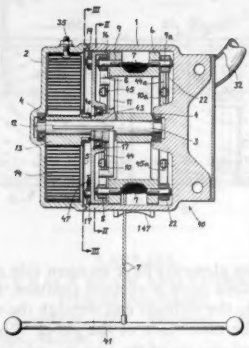
A trolley hanger assembly for carrying garment-laden hangers along a trolley rail having two spaced-apart arms with a bearing housing rotatably attached to each of said arms. The two bearing housings each having two sets of rollers for engaging the trolley rail. A carrying rod hingedly attached to the arms for carrying the garments.

3,587,474

DRAGLINE WINCH FOR SKI TOWS AND THE LIKE

Franz Fuchs, Immenstadt, Allgau, Germany, assignor to Dr. Werner Rohrs K.G., Sonthofen, Allgau, Germany

Filed May 23, 1968, Ser. No. 731,403
Int. Cl. B61b *11/02*; B65h *54/02*
U.S. Cl. 104—173 7 Claims



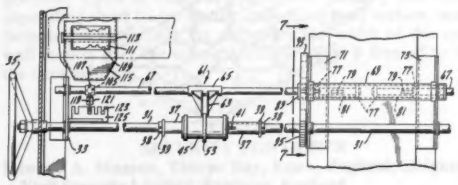
To couple a tow bar of a ski tow to a moving conveyor, the latter is fastened to a winch with a cylindrical housing wherein a shaft is rotatable against the restoring force of a spiral spring and carries a reel around which a cable anchored to the tow bar is wound. Tension on the cable activates a normally inoperative brake which is exclusively or more highly effective in the unwinding direction and progressively impedes rotation of the reel after overcoming a countervailing biasing force.

3,587,475

SELECTIVELY ACTUATED HOPPER CAR DOORS

Eduardo M. Damy, and Sergio Rene Damy, Apartado Postal 2041, Guadalajara, Jalisco, Mexico

Filed Dec. 27, 1968, Ser. No. 787,373
Int. Cl. B61d *7/18*, *7/26*, *19/00*
U.S. Cl. 105—287 6 Claims



A railroad hopper car of the ballasting type in which each discharge chute is closed by two doors which can be operated independently of one another. The doors of each chute are located on opposite sides of one of the rails on which the car is riding. A selector mechanism is provided to select either one, both or neither of each pair of doors for operation upon rotation of a common operating shaft. A pair of doors and a selecting and operating mechanism for a discharge chute comes in a package which can be removably connected to a discharge chute of a hopper car.

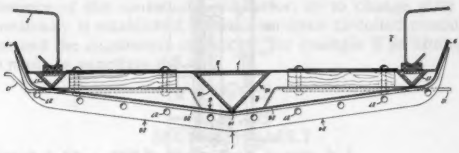
3,587,476

REINFORCED FIBERGLASS HATCH COVER

Orville Ingram, Toledo, Ohio, assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Sept. 16, 1968, Ser. No. 759,856
Int. Cl. B61d *39/00*
U.S. Cl. 105—377 10 Claims

A hollow fiberglass hatch cover for a roof hatch of a covered railway hopper car formed of separately molded top and bottom fiberglass panels and reinforced longitudinally by internal trussing and laterally by external ribbing connecting



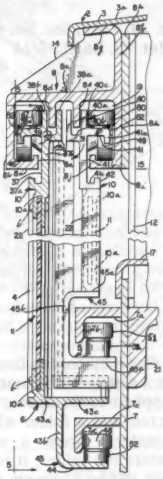
adjoining sections of the top panel for combining great strength and durability with very light weight.

3,587,477

RAILROAD CAR DOOR MEANS

Ray L. Ferris, Thornton, Ill.; William R. Shaver, Munster, Ind., and Jan W. Dohne, South Holland, Ill., assignors to Pullman Incorporated, Chicago, Ill.

Filed Dec. 30, 1968, Ser. No. 787,445
Int. Cl. B61d *17/00*
U.S. Cl. 105—378 8 Claims



In a railroad box car, a pair of slidable doors extending the length of the car, the upper and lower door framing of each door providing a baffle seal arrangement with the upper side plate and lower side sill, the upper and lower framing carrying roller means mountable on track structure on the side plate and side sill to slidingly support the doors for movement toward and away from one another, the outer end of each door sealing with the respective outer post and the inner end of each door sealing with the other, the inner door sliding past the outer door to permit approximately one-half of the car side to be exposed.

3,587,478

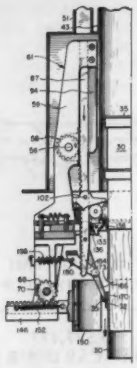
DISPENSER MECHANISM

George A. Tomik, Willow Hill Farm, Rte. 2, Peotone, Ill.

Filed May 7, 1969, Ser. No. 822,643
Int. Cl. A23g *5/02*
U.S. Cl. 107—8A 25 Claims

A mechanism for automatically and mechanically

dispensing measured quantities of semisolid food products



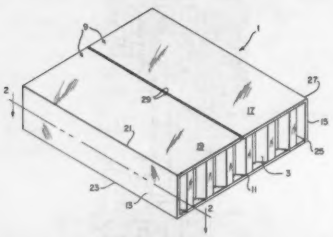
such as ice cream or the like from a refrigerated storage drum.

3,587,479

CELLULAR STRUCTURAL PRODUCTS

Robert C. Geschwender, 1800 Center Park Road, Lincoln, Nebr.

Filed Sept. 29, 1967, Ser. No. 671,864
Int. Cl. B65d *19/18*
U.S. Cl. 108—51 13 Claims



A cellular plank is made by continuously pulling a band of cellular material from a supply of the material. As the band is pulled, adhesive is applied to its upper, lower and sidewise faces. It is then directed into a folder which also receives a strip of wrapping material from a supply. Before the wrapping material enters the folder, it is scored along lines which will register with the four corners of the cellular band. The width of the scored strip is equal to the perimeter of an orthogonal cross section of said band. Then as the band and the wrapper pass through the folder, the latter is wrapped about the former so as to be adhered to it by means of the adhesive. After the combined material leaves the folder and the adhesive has set, it is in the form of a wrapped plank which is then cut into appropriate lengths for structural use. A preferred form is that of a block. In some cases several strips are employed for wrapping the blocks but in any event the wrapper covers the top, bottom and two sides of the block leaving the end faces open. The preferred form of cellular material is of the honeycomb type, although it is contemplated that a polyurethane or other like foam material may also be employed.

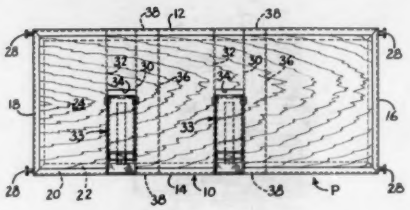
3,587,480

LADING PANEL WITH TINE-RECEIVING ELEMENTS

Samuel H. Enochian, Thornton, Ill., assignor to Unarco Industries, Inc.

Filed Mar. 21, 1969, Ser. No. 809,065
Int. Cl. B65d *19/00*
U.S. Cl. 108—51 4 Claims

A panel for separating or carrying lading comprises spaced elongated tine-receiving elements which are pivotally mounted in at least one of the faces of the panel adjacent its center of gravity and which extend to a point near the edge of the panel where an opening is provided for receiving the tines of a fork lift. The opening is arranged to receive the fork lift tines when the panel is positioned either in a horizontal or a vertical position and, when the panel is lifted, it swings to an upright attitude upon the tines for carrying.



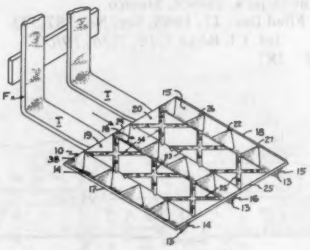
The tine-receiving elements have an open side and, when the panel is to be lifted from a vertical position, the tip of the tine is passed into the element and through the open side to a point adjacent the other face of the panel. When the tine is vertically elevated, the tip of the tine moves parallel and substantially adjacent to the other face of the panel and the tine-receiving element is cammed outwardly progressively increasing the amount of tine which is received in the element.

3,587,481

PALLET

Russel P. Kincade, Oakland, Calif. (302 Easy St., Apt. 35, Mt. View, Calif. 94040)

Filed Apr. 24, 1969, Ser. No. 818,923
Int. Cl. B65d *19/18*
U.S. Cl. 108—53 5 Claims



Nestable pallet forms in a single sheet of thin gauged bendable material having a flat top surface from which V-shaped reinforcing depressions extend downwardly to provide parallel spaced legs between spaced web portions beneath which to receive the tines of a fork lift; and a plurality of inverted V-shaped zones aligned transversely of the legs in combination with trusslike crossed V-grooves in the web portions for rigidifying such pallet structure.

3,587,482

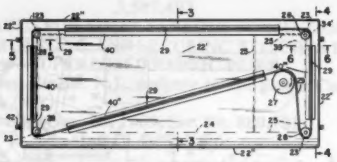
THERAPEUTIC TREATMENT TABLE

Roman G. Wieland, Valley City, N. Dak., assignor to Tri W-G, Inc., Valley City, N. Dak.

Filed Feb. 14, 1969, Ser. No. 799,473
Int. Cl. A47b *9/12*
U.S. Cl. 108—147 1 Claim

The invention comprises a motorized table for therapeutic treatment having four telescoping legs mounted to the frame with a reversible motor also mounted to said frame with the

motor shaft projecting vertically upward. A toothed gear mounted to said shaft and a gear mounted to each of the four telescoping legs. An endless link chain passing thereby the

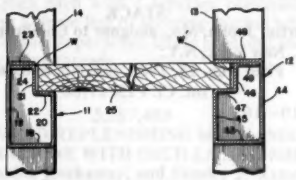


motor shaft gear and the four gears of the endless link chain to power the legs for raising and lowering the legs simultaneously.

3,587,483
STORAGE RACK BEAM AND STORAGE RACK UTILIZING SAME

Anthony N. Konstant, Mt. Prospect, Ill., assignor to Speedrack Inc., Skokie, Ill.

Filed Nov. 27, 1968, Ser. No. 779,451
Int. Cl. A47f *5/00*
U.S. Cl. 108—157 **9 Claims**

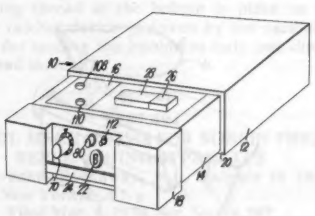


A storage rack including a pair of horizontal, parallel beams, each of which is a unitary sheet of steel formed as a tube to provide a recessed facing seat for supporting a horizontal deck. The top wall is formed of adjacent overlapping wall sections which reinforce each other and are generally equal in width to the bottom wall. By providing a depending short flange on the underlying wall section, manufacturing is facilitated. By extending the width of the upper wall section over the seat, a restraining slot is formed to hold the deck in place.

3,587,484
SECURITY CONTAINER

Edward A. Munton, Thorpe Bay, Essex, England, assignor to Vigil Security Limited, Brighton, England

Filed July 15, 1969, Ser. No. 841,877
Claims priority, application Great Britain, July 18, 1968, 34282/68
Int. Cl. G08b *15/02*
U.S. Cl. 109—25 **13 Claims**

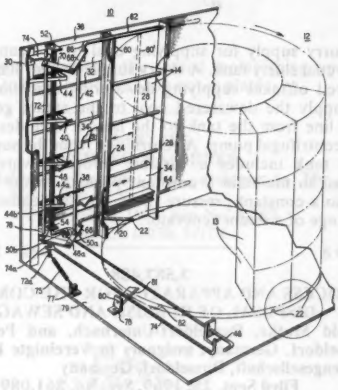


A portable security container is provided, at a wall thereof, with a guard circuit comprising an electrically continuous elongated convoluted conductor, and at least one open circuited elongated convoluted or branched conductor closely proximate the continuous conductor but insulated therefrom, a further circuit which can take more than one state being adapted to change state in response to a change in the resistance of the continuous conductor, or to change state if continuity is established between an open circuited conductor and the continuous conductor, for example if an attempt is made to penetrate the wall.

3,587,485
SECURITY VAULT

Frank J. Shea, 258 E. Shore Trail, Sparta, N.J.

Filed Dec. 24, 1969, Ser. No. 887,925
Int. Cl. E05g *1/00*
U.S. Cl. 109—48 **16 Claims**

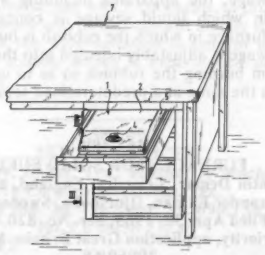


A security vault for storing coin receptacles and the like includes a vertical sectioned doorway in registration with groups of compartments in a multitier carousel. Upon each complete rotation of the carousel, a vertical security bar is moved to the center of the doorway to prevent access to the receptacles by unauthorized personnel. The bar is released by closing any one of a plurality of sliding doors over the section of the doorway corresponding to a completely filled tier. The sliding door is then automatically locked in a closed position. Means are also provided for closing the sliding doors in a predetermined sequence and for unlocking all the doors simultaneously.

3,587,486
DOCUMENT STRONG BOX

Heinz Gerd Heinrichs, 4 Dusseldorf, Binnenwasser, Germany

Filed Sept. 15, 1969, Ser. No. 858,036
Int. Cl. E05g *1/04*
U.S. Cl. 109—51 **3 Claims**

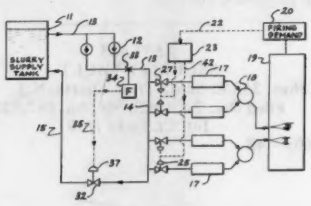


A strong box for documents to be mounted within a desk drawer or at a wall and adapted to house documents of standardized dimensions.

3,587,487
COAL SLURRY FEED SYSTEM

John A. Makuch, Granby, and Richard D. Brown, Newington, Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Feb. 20, 1970, Ser. No. 13,084
Int. Cl. F23d *1/00*
U.S. Cl. 110—7-S 10 Claims

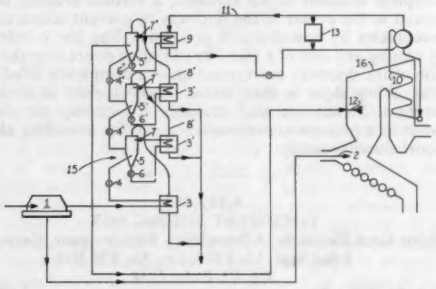


A slurry supply for supplying coal to a steam generator from a coal slurry tank. A slurry supply header has a plurality of valved offtakes supplying dewatering machines which in turn supply the dewatered coal to the steam generator. A supply line from the tank to the header includes a constant speed centrifugal pump. A return line from the supply header to the tank includes a variable throttling valve which is operated to maintain a constant velocity in the supply line and also a constant pressure in the supply header across the load range of a steam generator.

3,587,488
PROCESS AND APPARATUS FOR THE COMBINED DISPOSAL OF RUBBISH AND SEWAGE

Reinhold Mutke, Dusseldorf-Unterbach, and Peter Steller, Dusseldorf, Germany, assignors to Vereinigte Kesselwerke Aktiengesellschaft, Dusseldorf, Germany

Filed Sept. 25, 1969, Ser. No. 861,089
Claims priority, application Germany, Nov. 26, 1968, P 18 10 975.6
Int. Cl. F23g *5/00*
U.S. Cl. 110—7 18 Claims



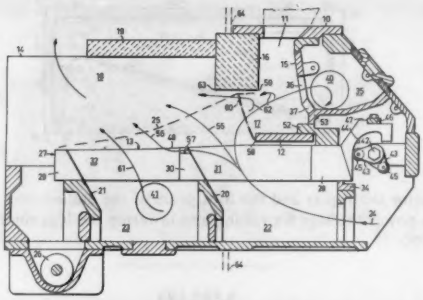
Process and apparatus for the combined disposal of rubbish and sewage, the apparatus including a heat-operated evaporator in which liquid sewage is concentrated and a combustion furnace in which the rubbish is burned. The concentrated sewage is adjustably injected into the hot flue gases resulting from burning the rubbish so as to cool these gases and maintain the same at a predetermined temperature.

3,587,489
FURNACES FOR SOLID FUEL

Viking Valentin Demar, Leicester, England, assignor to Carl Oscar Alexander Ekman, Djursholm, Sweden

Filed Apr. 30, 1969, Ser. No. 820,486
Claims priority, application Great Britain, May 2, 1968, 20960/68
Int. Cl. C10b *31/02*
U.S. Cl. 110—31 21 Claims

A furnace for burning solid fuels such as bituminous coals comprises a grate, a fuel inlet shaft which communicates only at its lower end with a combustion chamber above the grate by means of a restricted opening beneath a solid transverse wall, the lower end portion of the fuel inlet shaft forming a degassing chamber. A gas duct is provided for conveying gas

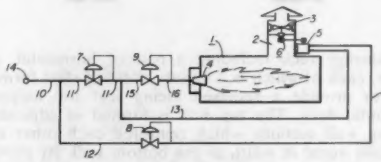


from the degassing chamber for distribution beneath a rearward section of the grate. In accordance with the invention, the bottom end of the degassing chamber portion of the inlet shaft is closed.

3,587,490
METHOD AND MEANS FOR INDUCING DRAFT IN A STACK

Bill G. Martin, Joplin, Mo., assignor to Combustion Engineering, Inc., New York, N.Y.

Filed Aug. 15, 1969, Ser. No. 850,460
Int. Cl. F23l *17/00*
U.S. Cl. 110—162 7 Claims

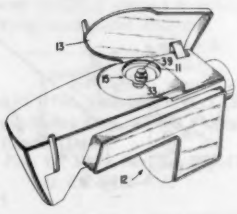


A fan is arranged in the exhaust stack of a fluid fuel burning heater to induce draft. The energy of a high pressure fuel line is tapped to power a fluid-driven motor which in turn drives the fan. The fuel is then burned in the heater. Fuel line pressures and flow rates are controlled as required.

3,587,491
CAM REMOVAL UNIT

Louis Fawcett Daman, Martinsville, N.J., assignor to The Singer Company, New York, N.Y.

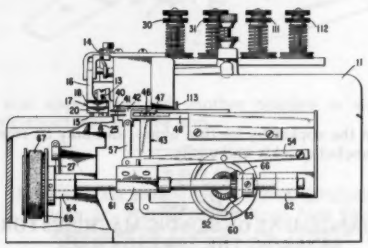
Filed May 4, 1970, Ser. No. 034,036
Int. Cl. D05b *3/02*
U.S. Cl. 112—158R 7 Claims



A pattern cam removal device for a zigzag sewing machine which provides for the elevation of a plunger in response to

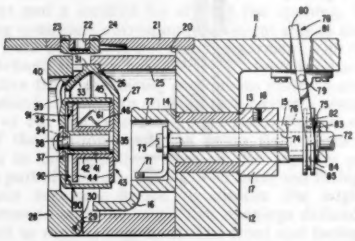
the manual depression of a pattern cam on a cam seat and for the elevation of the pattern cam upon manual depression of the plunger.

3,587,492
APPARATUS FOR SIMULTANEOUS FORMATION OF OVERCASTING AND SECURING STITCHES IN SUPERPOSED FABRIC PLIES
Roger J. Ross, Roselle, N.J., assignor to The Singer Company, New York, N.Y.
Filed Nov. 28, 1969, Ser. No. 880,781
Int. Cl. D05b *1/20*
U.S. Cl. 112—162 **3 Claims**



A sewing machine for overcasting the edges of two superposed fabric plies each with a separate overcasting thread and for forming a single line of securing stitches which simultaneously unites said superposed fabric plies and anchors said separate overcasting threads.

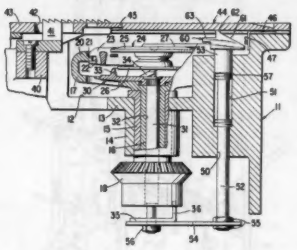
3,587,493
BOBBIN THREAD REPLENISHING MECHANISMS FOR SEWING MACHINE WITH OSCILLATING SHUTTLE
Michael F. Ivanko, Rockaway, and Stanley J. Ketterer, Morris Plains, N.J., assignors to The Singer Company, New York, N.Y.
Filed Feb. 17, 1970, Ser. No. 11,999
Int. Cl. D05b *57/14, 59/00*
U.S. Cl. 112—181 **6 Claims**



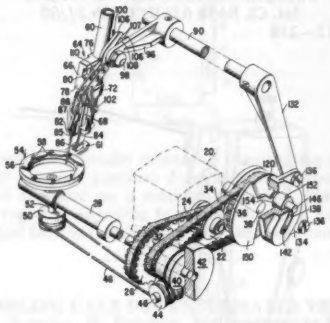
A lockstitch sewing machine having an oscillating loop taker is provided with a mechanism for replenishing thread on the bobbin while the bobbin is in place in the loop taker and while the loop taker partakes of the same oscillatory movement as during stitch formation. Means are disclosed for introducing thread to the bobbin in place on the loop taker, and a ratchet device is driven by the oscillating loop taker driver for turning the bobbin in only one direction to wind the thread thereon.

3,587,494
CONTROL MECHANISMS FOR BOBBIN THREAD REPLENISHING APPARATUS
Michael F. Ivanko, Rockaway, N.J., assignor to The Singer Company, New York, N.Y.
Filed Mar. 4, 1970, Ser. No. 16,287
Int. Cl. D05b *57/14, 59/00*
U.S. Cl. 112—184 **5 Claims**

A control mechanism for initiating the replenishment of thread on a bobbin in place in a sewing machine loop taker in response to retraction of a slide cover plate for the loop taker and for terminating the thread replenishing operation in response to closure of the slide cover plate.



3,587,495
SEWING MACHINES
Ralph E. Johnson, Boonton, N.J., assignor to The Singer Company, New York, N.Y.
Filed Feb. 3, 1970, Ser. No. 8,257
Int. Cl. D05b *57/14*
U.S. Cl. 112—184 **6 Claims**

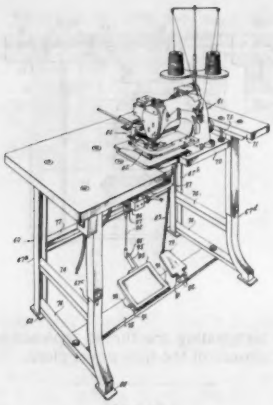


A lockstitch sewing machine with a loop taker which is driven in an untimed relation with the complemental stitch forming instrumentalities is provided with a common driving source for a needle reciprocating mechanism and a needle thread takeup mechanism which cooperate to provide needle thread manipulation and thread control ideally suited for accommodation of the wide variation in time of loop seizure, expansion, and release which is experienced using an untimed loop taker.

3,587,496
SEWING DEVICES
Ronald L. Timby, Dallas, Tex., assignor to Machinery Automation Research Corporation, Dallas, Tex.
Filed Dec. 28, 1967, Ser. No. 694,154
Int. Cl. D05b *27/00*
U.S. Cl. 112—217 **19 Claims**

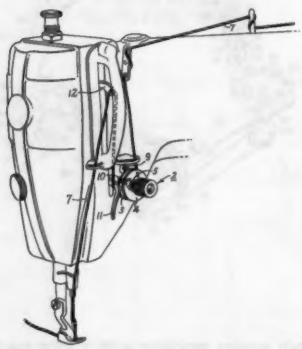
A sewing machine having a folding assembly disposed rearwardly of the presser foot and feed bar of a sewing machine for folding back sections of a pair of overlapped pieces of material on opposite sides of the seam perpendicularly from the seam into parallel relationship and a moving

and pressing assembly for moving the sewed overlapped sections of material rearwardly from the machine through the



folding assembly and pressing the folded sections in their perpendicular positions in parallel relationship to each other.

3,587,497
THREAD BREAKAGE DETECTOR
Aubrey G. Beazley, El Paso, Tex., assignor to Farah Manufacturing Company, Inc., El Paso, Tex.
Filed Jan. 30, 1969, Ser. No. 795,291
Int. Cl. B65h *63/02*; G08b *21/00*
U.S. Cl. 112—218 7 Claims



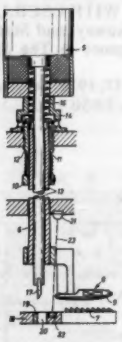
A novel sewing machine upper thread breakage detector has been provided which reliably signals the failure by the sewing machine to sew properly because of the upper thread breakage. The thread breakage is detected despite relatively high contact resistance in the operating circuit attributable to varying amounts of contaminants. The contacts are not used directly in operating a relay; rather, the high resistance contact is transformed to operate a low impedance relay drive.

3,587,498
SEWING NEEDLE CLAMP
William Weisz, Wayne, N.J., assignor to The Singer Company, New York, N.Y.
Filed Dec. 11, 1969, Ser. No. 884,892
Int. Cl. D05b *55/02*
U.S. Cl. 112—226 1 Claim

A sewing machine needle and needle clamp arrangement wherein the shank of the needle is provided with a butt portion many times larger than the needle blade. The needle clamp includes a needle butt accommodating socket and means whereby the needle simply by being inserted therein is

secured in the socket by friction alone, and may be removed from the socket quickly and easily.

3,587,499
ARRANGEMENT ON SEWING MACHINES FOR SEVERING THE THREAD CHAIN
Gerhard Murdter, Balingen, Germany, assignor to G.M. Pfaff AG, Kaiserslautern-Pfalz, Germany
Filed Dec. 9, 1969, Ser. No. 883,558
Claims priority, application Germany, Dec. 19, 1968, G 68 12 123
Int. Cl. D05b *65/00*
U.S. Cl. 112—252 1 Claim

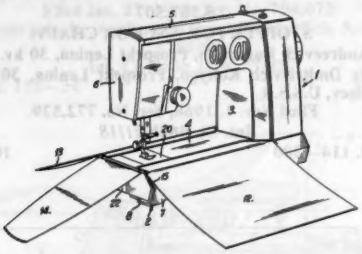


The arrangement for cutting the thread chain between two work blanks on a sewing machine comprises an up and downward movable cutter arranged behind the needle parallel to the presser bar and a stationary countercutter arranged in the proximity of the stitch forming location where the presser foot bar is circular in cross section and the operating bar for the movable cutter is arranged coaxially therewith.

3,587,500
SEWING MACHINE CASING
Marcel Fresard, Petit-Lancy, and Francis Plomb, Geneva, Switzerland, assignors to Mefina S. A., Fribourg, Switzerland
Filed Apr. 22, 1969, Ser. No. 818,294
Claims priority, application Switzerland, June 5, 1968, 8328/68
Int. Cl. D05b *75/00*
U.S. Cl. 112—258 7 Claims

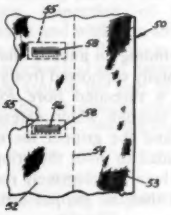
A sewing machine base comprises two longitudinal supports that enable the free lower arm to be set nearer the table

surface. Two side flaps hinged to these supports by means of side panels can take one position in which they enlarge the



free arm upper face and another position in which they completely expose the free arm.

3,587,501
METHOD OF FORMING A PIPED OPENING
John L. Cruden, Jr., Marvin Hollow Road, New York, N.Y.
Filed June 25, 1968, Ser. No. 739,812
Int. Cl. D05b *3/00;* **A41d** *27/20*
U.S. Cl. 112—264 **7 Claims**

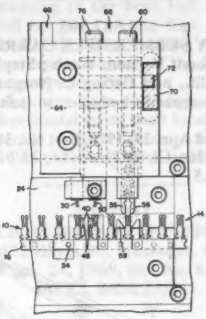


This disclosure is directed to a piped opening for use in a garment and a method for making the opening. The piped opening comprises corresponding die-cut slits or cuts formed in the front and facing portion of a garment with the flap or flaps defined thereby being reversely folded inwardly of the respective front and facing portions to define a corresponding opening therein. An edging patch having a complementary slit or cut and reversely folded patch flaps is secured to one of the portions with the patch flaps positioned contiguous to corresponding flaps of the adjacent portion to form a partially piped opening. The front and facing portions are then reversely folded to dispose the edging patch therebetween with the respective openings defined in each, disposed in coaxial alignment. The front and facing portions are then secured.

The method of forming such piped openings comprises the steps of first accurately locating and forming a die-cut or slit in the portion opposite the partially formed or preformed piped opening in the other portion of the garment. The flaps thus defined by the die-cut or slit are reversely folded inwardly of its respective portion and the respective portions reversely folded so that the flaps of the die cut or slit opening are disposed contiguous to the partially formed piped opening in the other portion, and the respective front and facing portion then secured together.

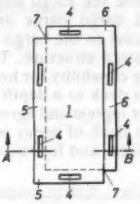
3,587,502
ELECTRICAL CONNECTOR, METHOD AND APPARATUS
Robert Maclay Murray, Elizabethtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Oct. 8, 1969, Ser. No. 864,787
Int. Cl. B21d *53/36*
U.S. Cl. 113—1 **7 Claims**

An electrical connector formed by a die blanking operation having an improved smooth edge contact surface formed by a fine scraping of said edge to remove the rough fractured surface remaining after the blanking operation; also, the



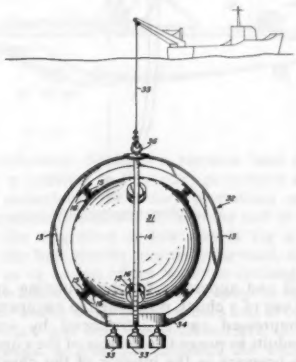
method and apparatus for forming said improved smooth contact surface.

3,587,503
MEANS FOR CONSTRUCTING BUOYANT PLATFORMS
Eugen Stehr, Hindenburgdamm 55, Berlin, Germany
Filed Mar. 6, 1969, Ser. No. 804,843
Int. Cl. B63b *35/00;* **E02b** *17/00*
U.S. Cl. 114—0.5 **4 Claims**



The invention provides means for constructing a single or multilayer bouyant platform from individual buoyant units which are designed on a modular basis and which can be coupled together edgewise by complementary tongues and grooves and face-to-face through self-aligning openings.

3,587,504
HANDLING CAGE FOR UNDERWATER VESSEL
Stuart D. Kearney, II, Potomac, Md., assignor to The United States of America as represented by the Secretary of the Navy
Filed July 3, 1969, Ser. No. 838,924
Int. Cl. B63b *3/13;* **B63g** *8/00*
U.S. Cl. 114—16 **6 Claims**



A cage, for a buoyant vessel, adapted to transport the vessel from a ship to the water and from the water to the ship

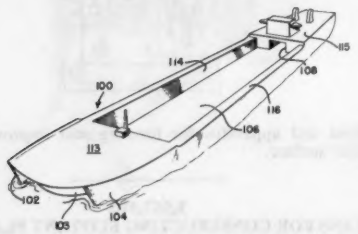
and while underwater to protect and restrain the movements of the vessel.

3,587,505

PARTIALLY SUBMERSIBLE CARRIER VESSEL

Paul S. Wells, Mount Vernon, Wash.; Stephen P. Henderson, Greenbrae, Calif., and Loring C. Norgaard, San Fransico, Calif., said Norgaard, assignor to said Wells and said Henderson.

Filed Apr. 23, 1970, Ser. No. 31,208
Int. Cl. B63b *35/44, 25/02*
U.S. Cl. 114—43.5 **10 Claims**



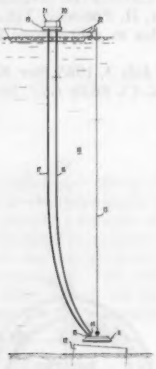
A carrier vessel for transporting cargo barges has multiple relatively low draft, hulls with a cargo deck supported by the hull section, and sidewall and bow and stern structures extending upwardly above the cargo deck so as to provide a peripherally confined cargo barge area bottomed by the cargo deck, barge access to the cargo deck being through a stern closure in the stern structure. The vessel is provided with a water ballasting capability for lowering the vessel so as to submerse the cargo deck to a depth greater than the draft of the cargo barges for ingress and egress of the cargo barges, for clearing the cargo deck of water so as to position cargo barges on the cargo deck, and for raising the vessel to a normal cruising level.

3,587,506

METHODS AND APPARATUS FOR MANIPULATING SUBMERGED OR UNSUBMERGED OBJECTS

Sheldon Thompson, 2187 12 St., Sarasota, Fla.

Filed Dec. 23, 1968, Ser. No. 791,852
Int. Cl. B63c *7/02*
U.S. Cl. 114—51 **22 Claims**



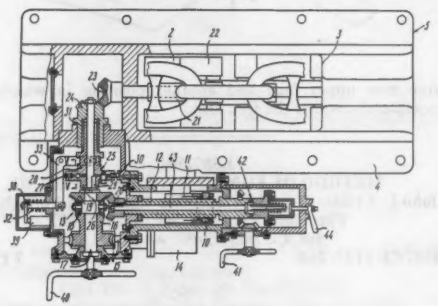
A method and apparatus for manipulating an object, including the use of a chuck positioned in engagement with the object. Compressed gas is introduced by control valves through conduits to purge the interior of the conduits and the chuck. The pressure in the interior of the chuck is then relieved or reduced in order to create a pressure differential across the chuck sufficient to secure the chuck to the object. The chuck secured to the object is then moved by conventional manipulating equipment connected to the chuck.

3,587,507

STOPPER FOR ANCHOR CHAIN

Boris Andreevich Bugaenko, Prospekt Lenina, 30 kv. 32, and Vasily Dmitrievich Koltygo, Prospekt Lenina, 30 kv. 30, Nikolaev, U.S.S.R.

Filed Nov. 1, 1968, Ser. No. 772,529
Int. Cl. B63b *21/18*
U.S. Cl. 114—200 **10 Claims**



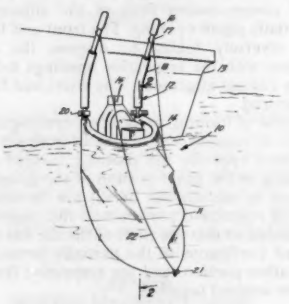
Apparatus for winding an anchor chain is provided with a gripper that is pivotally supported freely on a shaft. The shaft is provided with a threaded bore extending transversely therethrough and through which extends a drive screw for shifting the shaft and the gripper therealong. A driving arrangement is provided to pivot the gripper toward and away from the anchor chain as selectively required, and to rotate the drive screw so that the gripper can be shifted along the anchor chain.

3,587,508

OUTDRIVE PROTECTIVE APPARATUS

James L. Pearce, 1061 Bali Drive, Cocoa Beach, Fla.

Filed May 22, 1969, Ser. No. 826,864
Int. Cl. B63b *17/00*
U.S. Cl. 115—0.5 **9 Claims**



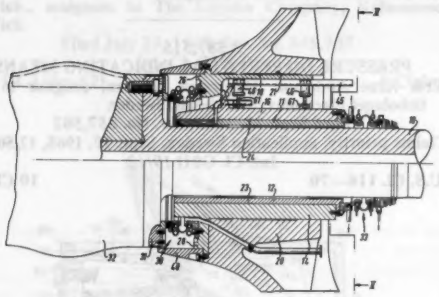
An outdrive protective apparatus is provided for easy attachment to a boat to protect the outdrive of an inboard-outboard motor from marine growth, and the like, when the boat is not in use. A bag is adapted for placement around the outdrive unit and for easy attachment to the transom of a boat in a manner to provide a watertight seal between the bag and the transom and around the outdrive unit with an opening in the back maintained above the water level.

3,587,509

TAIL-SHAFT BEARING ASSEMBLY

John A. Clay, Sale, England, assignor to Turnbull Marine Design Company Limited, Sale, England

Filed Jan. 27, 1969, Ser. No. 794,072
Claims priority, application Great Britain, Feb. 5, 1968, 5755/68
Int. Cl. B63h *1/14, 23/32*
U.S. Cl. 115—34 11 Claims



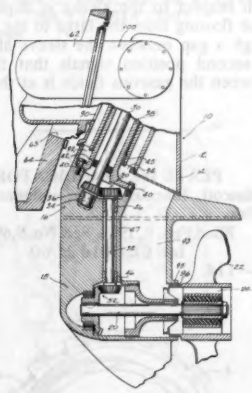
A bearing assembly for the propeller shaft of a ship is provided in a housing removably secured in the stern of the ship and a bearing cap forming part of the bearing assembly is removable to allow inspection of the shaft without disturbance of the shaft and while the ship is afloat. A seal is provided between a semiradial flange on the bearing cap and the housing, and a mechanical seal between the housing and the propeller extends around the part of the shaft supported by the bearing assembly. Hydraulic means are provided for securing and for removing the bearing cap.

3,587,510

MARINE PROPULSION DEVICE WITH SPLIT DRIVE SHAFT

William J. Shimanckas, Waukegan, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Aug. 19, 1969, Ser. No. 851,211
Int. Cl. B63h *25/42*
U.S. Cl. 115—35 13 Claims



Disclosed herein is a marine propulsion unit which includes a drive shaft housing having upper and lower housing sections with the upper housing section rotatably supported for vertical swinging movement about a horizontal tilt axis. The drive train connecting the propeller shaft to engine output shaft includes first and second drive shafts. The first drive shaft is rotatably supported and extends through the upper drive shaft housing and into the lower housing section. The lower housing section is rotatably connected to the upper housing section for rotation about the axis of the first drive shaft to afford steering of the boat hull. The second drive shaft is connected by gears to the first drive shaft and is rotatably supported in the lower housing section for rotation about an axis transverse to the axis of the first drive shaft and at right angles to a propeller shaft.

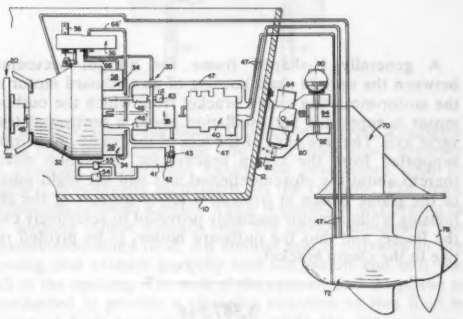
The transfer of power from the engine to the first drive shaft includes a horizontal cross shaft located in coaxial relation to the horizontal tilt axis. Steering of the lower housing section is afforded by a steering drive or linkage.

3,587,511

HYDRAULIC MARINE PROPULSION SYSTEM

Curt Buddrus, 2522 Hayes St., Muskogee, Okla.

Filed Apr. 24, 1969, Ser. No. 818,888
Int. Cl. B63h *23/26*
U.S. Cl. 115—34 10 Claims



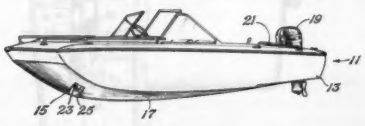
A hydraulic propulsion system featuring an inboard power plant and fluid pressure-generating system and an outboard fluid driving system, the inboard pressure-generating system consisting of reversible variable displacement axial piston pump, lever-operated servosystem, speed control, charge pump and valve manifold units and the outboard fluid-driving system consisting of a fixed displacement axial piston fluid motor and propeller.

3,587,512

BOAT WITH SECONDARY PROPULSION MEANS

Walter H. Patterson, 1617 Hilltop Lane, Arlington, Tex.

Filed Mar. 12, 1969, Ser. No. 806,442
Int. Cl. B63h *5/06*
U.S. Cl. 115—41 8 Claims



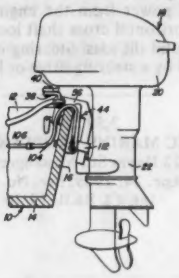
This specification discloses a pleasure boat characterized by having, in addition to a primary propulsion and guidance means, a retractable secondary propulsion and guidance means extendible downward through the hull of the boat into the water for operation at low speeds via a well that is located in the hull outside, normally forward, of the planing surface so as to be out of the water at cruising speeds. The pleasure boat described has a hull adapted to operate with a draft surface in the water at low speeds and to operate with a planing surface less than the draft surface in the water at cruising speeds. In one embodiment, the well is disposed slightly to one side of the keel line of the boat. Specific equipment and arrangements are described.

3,587,513

POWER TILT FOR OUTBOARD MOTORS

Lawrence L. Stimatze, 909 S. Main, Hutchinson, Kans.

Filed Mar. 27, 1969, Ser. No. 811,054
Int. Cl. B63h 5/12, 21/26
U.S. Cl. 115—41 9 Claims



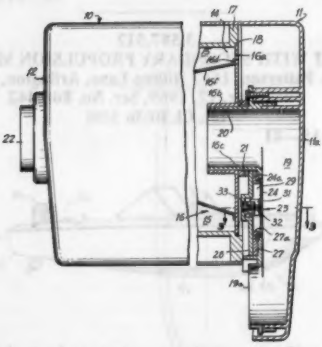
A generally U-shaped frame for upright securement between the upright shaft housing of an outboard motor and the motor-mounting clamp bracket from which the outboard motor is supported for oscillation about a horizontal transverse axis. The free ends of the legs of the frame are pivotally supported from the clamp bracket for oscillation relative thereto about the aforementioned axis and the bight portion of the frame passes in front of a lower portion of the shaft housing while a motor assembly provided to selectively cause the frame, and thus the outboard motor, to be pivoted relative to the clamp bracket.

3,587,514

DEVICE FOR SIGNALING NEED FOR CLEANING OR REPLACING SUCTION CLEANER DUST BAG

Hubert Marc William Autrand, La Garenne-Colombes, France, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Nov. 3, 1969, Ser. No. 873,309
Claims priority, application Sweden, Nov. 8, 1968, 15,154/68
Int. Cl. G08b 3/00
U.S. Cl. 116—67 10 Claims



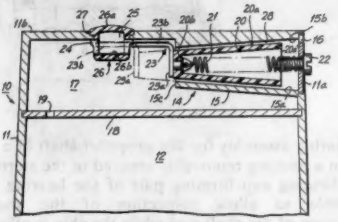
This invention relates to a device for indicating or signaling the need for cleaning or replacing a suction cleaner dust bag due to dirt trapped therein. The device produces an audible signal when a valve moves from a closed to an open position to allow air to flow to the atmosphere through a passageway from the interior of the suction cleaner. The valve forms a part of an armature member which is magnetically attracted by a magnet and is movable therefrom. A diaphragm is movable from a first position to one of several second positions responsive to the pressure differential at opposite sides of the dust bag, the diaphragm in its second positions acting on the armature member. When the valve is moved quickly from its closed position to a wide open position air flows at a high velocity through the passageway to cause the device to produce an audible sound of high intensity. Such quick movement of the valve from its closed to its open position is effected simultaneously with movement of the armature member from the magnet by a force which is dependent upon the particular second position to which the diaphragm is moved and which exceeds the force magnetically attracting the armature member to the magnet.

3,587,515

PRESSURE DIFFERENTIAL INDICATING MEANS

Erik Arne Anderson, Hagersten, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Sept. 12, 1969, Ser. No. 857,502
Claims priority, application Sweden, Sept. 17, 1968, 12,500/68
Int. Cl. G01l 19/12
U.S. Cl. 116—70 10 Claims



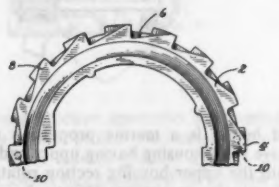
This invention relates to equipment for indicating a predetermined pressure differential between gaseous fluids at low and higher pressures. A hollow sleeve of conical form has an inner tapered wall. The large end of the hollow sleeve is in communication with the gaseous fluid at the higher pressure and its small end is in communication with the gaseous fluid at the low pressure. A movable member of conical form, which has a tapered outer wall, is disposed within the hollow sleeve with the small end of the member at the small end of the sleeve. The member, which is spring biased from the small end of the sleeve, has a signaling system part mounted thereon. The part and member are in one position with respect to the sleeve when the pressure differential between the gaseous fluids is less than a predetermined value and in a second position with respect to the sleeve when the pressure differential between the gaseous fluids is at the predetermined value. The relative position of the part and member with respect to the sleeve is dependent upon the velocity of air flowing from the large to the small end of the sleeve through a gap between the sleeve and member. The part in its second position signals that the pressure differential between the gaseous fluids is at the predetermined value.

3,587,516

PLATE WEAR INDICATOR

Dain D. Wainscott, Lincoln, Nebr., assignor to Lincoln AG-Products, Inc.

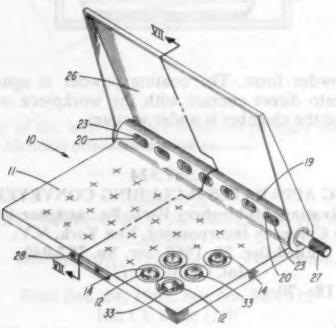
Filed Feb. 9, 1970, Ser. No. 9,694
Int. Cl. G01d 21/00
U.S. Cl. 116—114 9 Claims



A wear indicator taking the form, in the preferred embodiment, of a right cylinder is provided in a plate structure, for

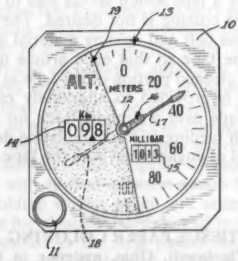
instance, a planting plate in the surface opposite that which is exposed to a wearing environment and being strategically located to encounter the greatest wear or erosion such that after a preselected thickness of material has been worn away, a hole will appear to visually indicate that the plate has worn beyond prescribed limits.

3,587,517
DISPENSER
Larry L. Fites, and Major C. Truckenmiller, Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.
Filed July 29, 1969, Ser. No. 845,735
Int. Cl. G09f 9/00
U.S. Cl. 116—121 9 Claims



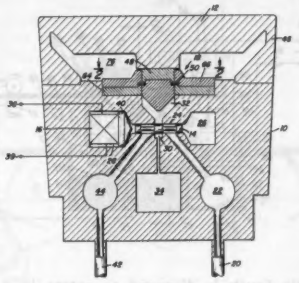
A dispenser adapted to dispense tablets or the like held in individual blisters on a tablet supply element comprises a tablet supply element, a carrier plate and a retainer plate for said element, both provided with a plurality of aligned apertures, indexing means along one edge of the carrier plate, and a cover means adapted to close over said carrier plate.

3,587,518
SENSITIVE METRIC ALTIMETER
Frederic Hauptman, Rego Park, N.Y., assignor to Kollsman Instrument Corporation, Syosset, N.Y.
Filed Nov. 3, 1969, Ser. No. 873,190
Int. Cl. G01d 13/02
U.S. Cl. 116—129F 6 Claims



A readout display for altimeters having a rotatable output indicator shaft includes a digital scale concentric of the shaft and extending approximately 180° radially thereabout. An indicator pointer having a pair of oppositely directed hands is mounted on the shaft for rotation therewith. A mask can be provided for rendering the hands individually invisible to the viewer when they are directed away from the scale.

3,587,519
HYDROACOUSTIC DRIVE MECHANISM HAVING A FLEXURAL SEAL
Max G. Utterback, Pittsford, N.Y., assignor to General Dynamics Corporation
Filed Aug. 4, 1969, Ser. No. 847,281
Int. Cl. G10k 9/00
U.S. Cl. 116—137 8 Claims



A hydroacoustic transducer is described having a radiator in the form of a flexing disc and an acoustic drive member for coupling a fluid-filled cavity, the pressurized fluid in which is acoustically modulated, to the radiator. The drive mechanism includes a piston which is guided in an opening in the housing which extends into the cavity containing the pressure-modulated fluid. An annular seal is provided in the opening and extends partially into the piston and into the wall of the opening. The wall of the opening and the piston is constructed to provide a clamping structure so that fluid is prevented from leaving the cavity while the piston is permitted to vibrate in response to the acoustic energy of the modulated fluid.

3,587,520
FLAGPOLE
Judson O. Miller, 1311 Hollywood Blvd., Hollywood, Fla.
Filed Oct. 20, 1969, Ser. No. 867,483
Int. Cl. G09f 17/00
U.S. Cl. 116—173 6 Claims

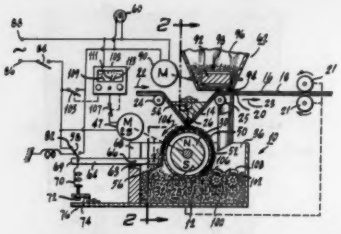
A flagpole in which a flag-carrying pole section is reversibly mounted on a base pole section, and the flag is attached to one end of the flag-carrying pole section, so that with the flag-carrying pole section mounted in one position the flag flies at top mast and with the flag-carrying pole section mounted in another position the flag flies at half-mast. In a preferred embodiment the flag-carrying pole section is rotatable relative to the base pole section.

3,587,521

APPARATUS FOR MONITORING AND CONTROLLING THE CONCENTRATION OF POWDER PARTICLES IN A MIXTURE OF POWDER AND MAGNETIC PARTICLES

Robert Aron Rubenstein, and James Conrad Schopp, Framingham, Mass., assignors to RCA Corporation

Filed Oct. 9, 1969, Ser. No. 865,076
Int. Cl. G03g 13/08
U.S. Cl. 118—7 21 Claims



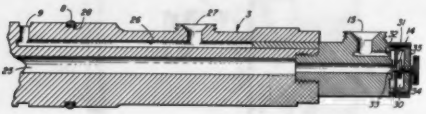
A magnetic brush is disposed to rotate in a source of developer mix, and a scraper member is disposed adjacent to the applicator surface of the magnetic brush to scrape developer mix therefrom. The physical force exerted on the scraper member by the scraping action is an inverse relationship to the concentration of toner particles in the developer mix. A sensor switch is coupled to the scraper member and is actuated when the force on the scraper member exceeds a predetermined value. The switch is included in a control circuit which is designed either to indicate the need for replenishment of toner particles in the developer mix or to actuate a toner particle replenisher means which adds toner particles to the developer mix.

3,587,522

SHEATHING OF ELECTRIC CABLES

John A. Baskwell, Winchester, England, assignor to Pirelli General Cable Works Limited, London, England

Division of Ser. No. 307,486, Sept. 9, 1963, Pat. No. 3,444,016.
Filed Feb. 5, 1968, Ser. No. 702,977
Int. Cl. B05c 7/06
U.S. Cl. 118—50 4 Claims



For the manufacture of sheathed, oil-filled cables by either presheathing impregnation with oil or postsheathing impregnation with oil, a plug is disclosed as a device for sealing the cable end and for providing a connecting path to the cable interior.

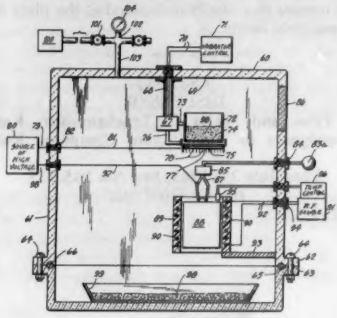
3,587,523

VACUUM COATING APPARATUS

Sidney Tudor, Williston Park, and Jack Mironov, Mount Vernon, N.Y., assignors to The United States of America, as represented by the Secretary of Navy

Filed Feb. 24, 1969, Ser. No. 801,523
Int. Cl. C23b 11/00
U.S. Cl. 118—50.1 5 Claims

A sealed chamber having means for evacuating the same and including means for suspending therein workpiece to be coated and providing for the heating of said workpiece. A lower portion of said chamber contains the material for coating in powder form. The coating powder is agitated and brought into direct contact with the workpiece while it is heated and the chamber is under vacuum.

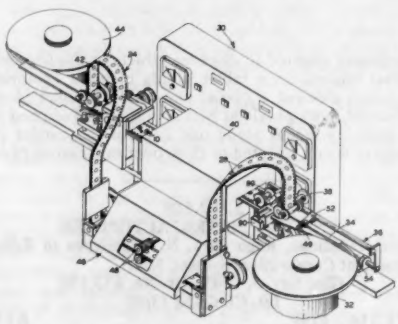


3,587,524

COATING APPARATUS INCLUDING CONVEYER-MASK

John M Keating, Muhlenberg Park, Pa., assignor to Western Electric Company Incorporated, New York, N.Y.

Filed Dec. 26, 1968, Ser. No. 787,040
Int. Cl. B05c 11/14
U.S. Cl. 118—70 7 Claims



Articles to be selectively coated, are conveyed through a coating station by a tape which serves also to mask areas of the articles where coating is not desired. The tape is in the form of an endless belt and coating material is continuously removed from the tape so that each article to be coated is presented with a cleaned portion of the tape as a mask. Automatic apparatus is provided to alternately raise and lower sections of the tape over a support track for the articles in coordination with feeding and accumulating devices to bring parts into and out of engagement with the tape.

3,587,525

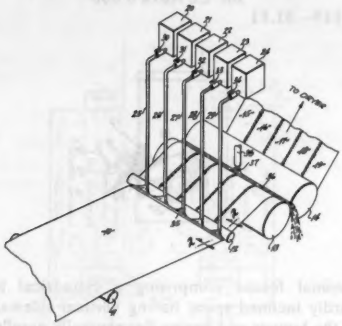
VARIEGATED TISSUE PAPER COLORING APPARATUS

Leo Fleischer, Cincinnati, Ohio, assignor to Crystal Tissue Company, Middletown, Ohio

Division of Ser. No. 810,900, Feb. 17, 1969, Pat. No. 3,512,914, which in turn is a continuation-in-part of 422,838, Dec. 31, 1964, now abandoned, and a continuation of application Ser. No. 257,189, Feb. 13, 1963, now abandoned.
Filed Oct. 27, 1969, Ser. No. 869,965
Int. Cl. B05c 11/02, 3/00
U.S. Cl. 118—115 4 Claims

A method of and apparatus for dyeing a web of paper, particularly tissue paper, into primary bands of different, bril-

liant, discrete colors extending longitudinally of the web which are separated by secondary bands also extending lon-

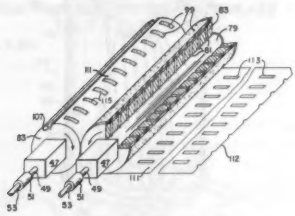


gitudinally of the web in which adjacent primary band colors are softly blended one with the other.

3,587,526
APPARATUS FOR APPLYING ADHESIVE TO SPACED AREAS

Robert C. Geschwender, 1800 Center Park Road, Lincoln, Nebr.

Filed Dec. 24, 1969, Ser. No. 887,912
Int. Cl. B05c *1/10*
U.S. Cl. 118—211 **11 Claims**

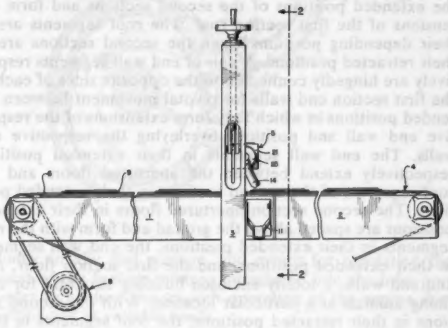


A strip or web of suitable material, such as treated kraft paper, metal foil or the like is drawn between rolls of a slitter, so designed that by means of a very simple adjustment the finished product may have a selected one of a number of sizes and angles of honeycomb-type cells. After slitting, the strip passes through an adhesive applicator having outlets to imprint staggered areas of adhesive on opposite sides of the strip between rows of slits. The applicator is constructed to prevent access of air to the adhesive during its travel from a supply to the imprinting region thus preventing premature setting of the adhesive and clogging of moving parts. Next the slitted web with applied adhesive passes between substantially spaced folding wheels which will accept strips of various thicknesses for pleating and designed to minimize smearing of the adhesive. As the strip passes through the folding wheels the adhesive spacedly joins adjacent pleats. After the pleated material leaves the pleating wheels it is sent to braking apparatus which forms a compaction wherein the adhesive sets. Then the material is drawn from the compaction by pulling apparatus to stretch it, thereby forming the honeycomb-type cells. As the cellular band is pulled its width becomes less. Width-sensing means provides a signal indicating any deviation from a desired width. This signal is applied to control means for the speed of operation of the pulling apparatus to compensate for any incipient deviation from the desired width.

3,587,527
CURTAIN COATING APPARATUS

Frederic F. Perry, Reading, Mass., assignor to K. J. Quinn & Co., Inc., Malden, Mass.

Filed Nov. 30, 1967, Ser. No. 686,897
Int. Cl. B05c *5/00*
U.S. Cl. 118—324 **19 Claims**

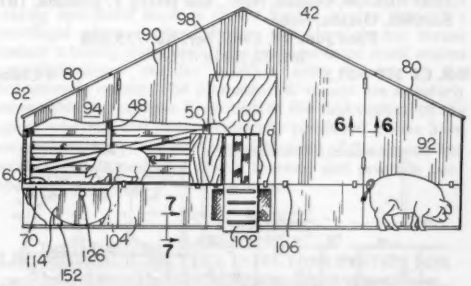


An improved coating device for use in coating objects passing along a path below the coating device and through a sheet of liquid coating material falling from the coating device, said device comprising a reservoir for holding a supply of liquid coating material, an internally disposed hollow housing for dispensing liquid coating material into the reservoir at a uniform chosen rate of flow, and a weir defining the effective upper edge of the reservoir over which the liquid coating material is directed, the weir having a downwardly extending surface terminating in an edge disposed in spaced relation above the objects to be coated and along which the liquid coating material overflowing the upper surface of the weir is adapted to flow to produce a downwardly falling sheet or curtain of liquid coating material through which the object is to be coated passes.

3,587,528
CONFINING STRUCTURE FOR ANIMALS

Carl V. Lake, R.R. #1, Woodburn, Ind.

Filed Sept. 10, 1968, Ser. No. 758,794
Int. Cl. A01k *01/00, 01/02*
U.S. Cl. 119—16 **15 Claims**



A confining structure for animals, particularly pigs, which includes a first section having a frame, a generally rectangular floor supported on the frame, wheels connected to the frame for movably supporting the structure with the first section floor spaced above the ground, a roof spaced above the floor, and opposite end walls extending upwardly between the opposite ends of the floor and the roof. A pair of second sections are provided respectively on opposite sides of the first section and each having an apertured floor. Each of the second sections has a frame supporting the apertured floor and movably connected to the frame of the first section for

movement of the respective second sections between retracted and extended positions, the second sections in their extended positions forming an enlargement of the first section with the apertured floors forming extensions of the first section floor. A pair of roof extension segments are respectively hingedly connected to the opposite sides of the first section roof for pivotal movement between extended and depending positions. The roof segments in their extended positions are respectively spaced above the apertured floors of the extended positions of the second sections and form extensions of the first section roof. The roof segments are in their depending positions when the second sections are in their retracted positions. A pair of end wall segments respectively are hingedly connected to the opposite sides of each of the first section end walls for pivotal movement between extended positions in which they form extensions of the respective end wall and positions overlaying the respective end walls. The end wall segments in their extended positions respectively extend between the apertured floors and the roof segments of the second sections in their extended positions. The second section apertured floors in their extended positions are spaced above the ground and form with the roof segments in their extended positions, the end wall segments in their extended positions, and the first section floor, roof and end walls, a totally enclosed building structure for confining animals at a particular location. With the second sections in their retracted positions, the roof segments in their depending positions, and the end wall segments in their folded positions, a totally enclosed building structure of smaller size is formed.

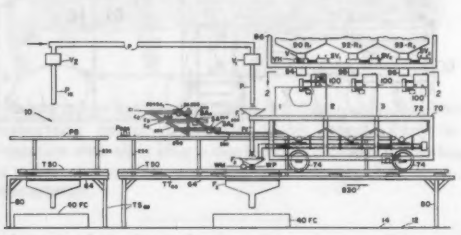
Other sidewall segments are provided respectively hingedly connected to the first section end walls, the end wall segments, and to the outer sides of the second sections for pivotal movement between downwardly extending positions and upwardly folded positions, these sidewall segments in their downwardly extending positions engage the ground and totally enclose the space beneath the first section floor and the apertured floors of the second sections in their extended positions thereby facilitating air-conditioning of the entire structure.

Receptacles are provided and removably positioned beneath the apertured floors of the second sections in their extended positions for receiving animal excrement. A vehicle structure is provided for placing the receptacles in their collecting positions beneath the apertured floors and later removing them; transporting them to a new location, and spreading the material on the ground.

3,587,529
LIVESTOCK FEEDER

Lloyd C. Wienert, 1117 Surrey Road, Millard, Nebr.; Lynn Fitzgerald, 7905 S. 37th, Omaha, Nebr.; Hiram A. Sturges, 5803 Nicholas, Omaha, Nebr., and Henry T. Johnson, 1817 S. 108th, Omaha, Nebr.

Filed June 10, 1968, Ser. No. 735,808
Int. Cl. A01k *05/00*
U.S. Cl. 119—51.5 **4 Claims**

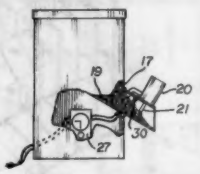


A livestock feeder comprising a frame supporting a plurality of spaced animal compartments, a moving feed delivery unit passing by the compartments and delivering feed into feed containers disposed in each of the compartments, mounting means including wheel means for mounting said feed delivery unit on said frame and guiding its travel along a row of the feed containers, and means for automatically driving the delivery unit along the row.

3,587,530
ANIMAL FEEDER

Weston L. Blair, 501 Anderson, Weatherford, Tex.

Filed Apr. 8, 1969, Ser. No. 814,391
Int. Cl. A01k *05/00*
U.S. Cl. 119—51.11 **1 Claim**

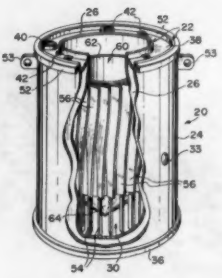


An animal feeder comprising a cylindrical hopper, a downwardly inclined spout having vertical sidewalls on the front of the hopper and having flat generally parallel top and bottom surfaces, an inclined surface in the hopper substantially in line with the bottom of the spout, a door in the spout and hingedly mounted in the upper rear portion thereof, and a solenoid on the spout operating the door.

3,587,531
BOILER SHELL ASSEMBLY

Everett E. Magnuson, Signal Mountain, Tenn., assignor to Eclipse Lookout Co.

Filed July 10, 1969, Ser. No. 840,769
Int. Cl. F22b *7/00*; **F23m** *9/00*
U.S. Cl. 122—156 **14 Claims**



A tubeless boiler shell assembly having high heat-transfer characteristics by reason of a novel disposition of heat-assimilating and transferring vanes which are coextensively attached to the interfacial heat-transfer surface between the fire and the water side of the shell proper of the assembly.

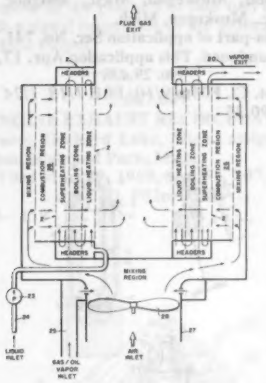
3,587,532
COMPACT FLUID HEATER

Jan P. Roos, 31-A Park Drive, Woburn, Mass.

Filed Sept. 3, 1969, Ser. No. 854,965
Int. Cl. F22b *21/24*
U.S. Cl. 122—356 **5 Claims**

A compact configuration for heating of a liquid, boiling of a liquid and superheating the vapor of a liquid. A cylindrical arrangement is provided in which products of combustion are introduced from the periphery of the configuration towards the axis thereof in a radially inward direction while the fluid to be heated follows a labyrinthine path from the axial region towards the peripheral region. The labyrinthine path consists predominantly of lengths of pipe of small diameter arranged axially in a cylindrical array in up to three coaxial zones. In the innermost zone the fluid is liquid. In the outermost zone the fluid is in the vapor state and the intermediate zone constitutes the boiler. Heat transfer surfaces are different in each zone. Nothing is added to the pipes in the vapor zone. The

pipes in the boiler are mechanically connected together by flat plate fins or other extended surfaces extending in the radial direction so as to provide minimum interference with flow of the products of combustion. Similar extended surfaces are used in the innermost zone, except that in this zone



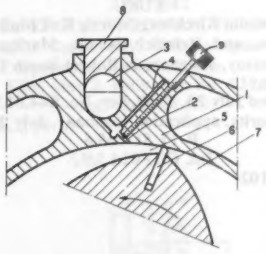
the fin surfaces in any plane are subdivided into concentric rings or cylinders whose inner peripheries are each attached to the outer exposed surfaces of a circular array of pipes, so that the concentric arrays of pipes are mechanically separated.

3,587,533

ACCUMULATOR CHAMBER FOR SUPPLYING FUEL TO A ROTARY PISTON ENGINE

Stanislaw Jarnuskiewicz, ul. Swierczewskiego 29 m 8, Krakow, Poland

Filed Nov. 6, 1968, Ser. No. 816,425
Int. Cl. F02b *53/10*
U.S. Cl. 123—8.09 **2 Claims**



A rotary piston internal combustion engine with improved fuel injection which is accomplished by having an accumulating chamber in the housing to receive some of the high pressure gases of the working chamber and pass these gases to the next successive, and lower pressure chamber, to effect fuel injection.

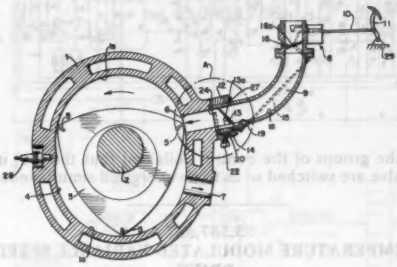
3,587,534

SUCTION SYSTEM FOR ROTARY PISTON INTERNAL COMBUSTION ENGINES

Wolfgang Weichelt, Zwickau, Germany, assignor to Veb Sachsenring Automobilwerke Zwickau Schliessfach, Zwickau, Germany

Filed May 13, 1969, Ser. No. 824,238
Int. Cl. F02b *53/06*
U.S. Cl. 123—8.13 **11 Claims**

A rotary type internal combustion engine of trochoidal configuration, including a single-stage carburetor, an auxiliary shutoff device in the induction passage anterior to the inlet port and a supplementary suction system disposed on the exterior of the body forming the induction passage, and coaligned with the shutoff device therein. The suction system



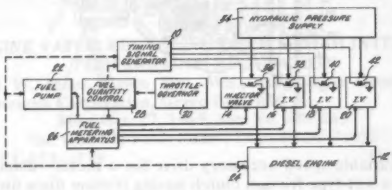
includes an idle fuel passage, and means for regulation the amount of the fuel-air mixture introduced into the inlet port in order to achieve the smooth operation of the engine during idling and at variable loads.

3,587,535

TIMING SIGNAL GENERATOR

John A. Kimberley, Granby, Conn., and Russell B. Hussey, East Longmeadow, Mass., assignors to AMBAC Industries, Incorporated, Garden City, N.Y.

Filed Dec. 6, 1968, Ser. No. 781,815
Int. Cl. F02m *51/02*
U.S. Cl. 123—32 **3 Claims**



A timing signal generator for producing electrical pulses to control the actuation of fuel-injection valves in a diesel engine system and to provide automatic timing advance. A rotating apertured mask is driven by the engine through a centrifugal advance-retard device, and photoelectric means produce a timing pulse each time said apertured mask attains a predetermined angular position with respect to the photoelectric means. The photoelectric means are angularly positionable in response to motion of the fuel control of the engine, whereby the photoelectrically produced pulses have time phases which vary not only with speed of the engine but also with the rate of fuel supply thereto, and produce corresponding variations in timing advance.

3,587,536

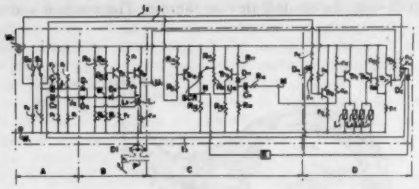
ELECTROMAGNETIC FUEL INJECTION SYSTEM FOR INTERNAL-COMBUSTION ENGINES

Takashi Inoue; Takao Masuda, and Takeshi Harada, Higashi-Matsuyama-shi, Japan, assignors to Diesel Kiki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 22, 1969, Ser. No. 868,388
Claims priority, application Japan, Oct. 30, 1968, 43/78552
Int. Cl. F02d *5/02*
U.S. Cl. 123—32 **7 Claims**

The control coils of fuel injection valves, one coil to one valve, are electrically connected to form a plurality of coil groups. During the low-speed operation of the engine, said groups of coils are sequentially energized so that the valves alternate in their injection action. When the sum of the coil energizing duration and a certain predetermined duration ex-

ceeds the duration proportional to the time required by engine to complete one revolution as the speed of the engine

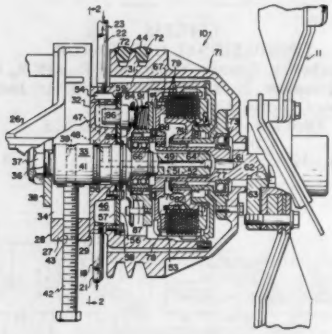


rises, the groups of the control coils and thus the fuel injection valve are switched so as to be energized simultaneously.

3,587,537
TEMPERATURE MODULATED VARIABLE SPEED DRIVE

Romas B. Spokas, and Grant H. Smith, Rockford, Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed May 2, 1969, Ser. No. 821,198
Int. Cl. F01p *7/02, 7/12*
U.S. Cl. 123—41.12 **2 Claims**

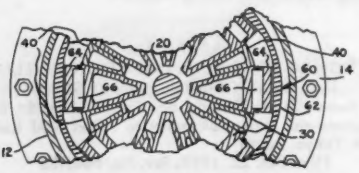


A variable speed accessory drive for a motor vehicle employs a wet-type friction clutch having friction discs disposed in a lubricating circuit for promoting slipping of the clutch. The clutch is urged toward driving engagement by a thermally extensible temperature sensor in series with a spring. The unit may be employed to drive a cooling fan at a speed proportional to the temperature of the engine coolant.

3,587,538
BARREL TYPE ENGINE

Edward M. Poole, 951 Parkway Blvd., Alliance, Ohio

Filed Apr. 14, 1969, Ser. No. 815,878
Int. Cl. F02b *53/00;* **F01b** *13/00, 13/04*
U.S. Cl. 123—45 **10 Claims**

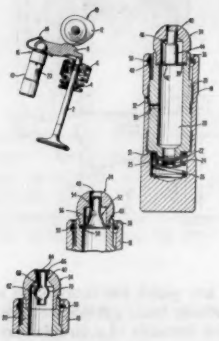


The disclosed barrel-type engine includes a plurality of preferably generally keystone-shaped pistons arranged annularly within an elongate housing of generally circular cross section. The pistons are arranged for parallel longitudinal reciprocation simultaneous with their rotation within and about the housing. This combination of reciprocatory and rotary motion is translated to a longitudinally extending shaft through a cam coupling circumscribing the housing and having longitudinally extending undulations. Preferably both ends of the pistons are working ends.

3,587,539
HYDRAULIC LASH ADJUSTER

Morris V. Dadd, Muskegon, Mich., assignor to Johnson Products, Inc., Muskegon, Mich.

Continuation-in-part of application Ser. No. 741,750, July 1, 1968, now abandoned. This application Apr. 17, 1970, Ser. No. 29,438
Int. Cl. F01m *9/10;* **F01l** *1/18, 1/24*
U.S. Cl. 123—90.35 **5 Claims**

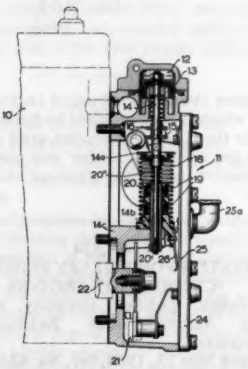


This disclosure relates to a hydraulic lash adjuster for overhead cam engines and the like. Oil within the piston body passes through the top of the piston to lubricate a closed socket between the rocker arm and the lash adjuster. A pin, positioned in the passage is reciprocatable. The extent of reciprocation of the pin within the passage in either direction is limited to prevent losing of the pin prior to installation of the lash adjuster into the engine.

3,587,540
RPM REGULATING SYSTEM FOR INTERNAL COMBUSTION ENGINES OPERATING ON INJECTED FUEL

Eberhard Hofmann, Kirchberg(Murr); Rolf Muller, Stuttgart-Zuffenhausen, and Heinrich Staudt, Markgroningen-Talhausen, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed July 23, 1969, Ser. No. 844,053
Claims priority, application Germany, July 25, 1968, P 17 51 765.6
Int. Cl. F02d *5/02*
U.S. Cl. 123—102 **7 Claims**



An r.p.m. regulating system that includes a hydraulic motor adapted to displace the fuel quantity control member of a fuel injection pump delivering fuel to an internal com-

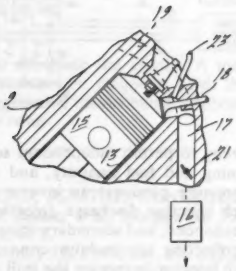
bustion engine, a solenoid valve that controls the admission of hydraulic fluid to, and its drainage from, said motor and an electronic control stage the energizing output signal of which, applied to said solenoid valve, is generated by the comparison of an r.p.m.-dependent electric signal and a signal responsive to the position of said fuel quantity control member with a signal responsive to the arbitrarily set value of a desired engine output.

3,587,541

ENGINE EXHAUST RECIRCULATION

Jorma O. Sarto, Orchard Lake, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Mar. 17, 1969, Ser. No. 807,706
Int. Cl. F02m *25/06*
U.S. Cl. 123—119 **9 Claims**



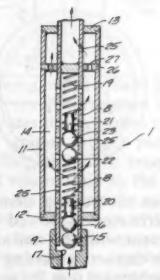
Controlled recycling of automobile exhaust gases through a bypass conduit connecting the exhaust system and the fuel and air inlet system is accomplished by means of a venturi in the exhaust system at its connection with the bypass conduit, and also by means of a pilot-type opening of the bypass conduit into the inlet system.

3,587,542

UNITARY ENGINE VAPOR RECYCLING DEVICE

Cecil W. Miles, Green Bay, Wis., assignor to Green Bay Research Corporation, Greenbay, Wis.

Filed May 2, 1969, Ser. No. 821,335
Int. Cl. F02f *9/02*
U.S. Cl. 123—119 **16 Claims**



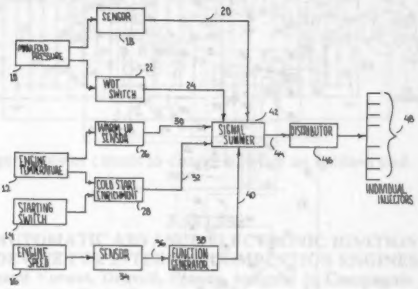
A unitary engine vapor recycling device for connection between the sealed crankcase and manifold of an engine. The device has a jacketed sleeve forming an outer chamber, and valve means are disposed in the sleeve which are responsive to manifold vacuum (or crankcase pressure). The sleeve is provided with ports at various levels, and the sleeve interior is blocked so that gases must pass through the chamber to get to the discharge end of the device. A restriction is placed in the chamber adjacent the blocked portion of the sleeve.

3,587,543

FLUIDIC FUEL INJECTION WITH BISTABLE VALVE

Janusz S. Sulich, Southfield, Mich., assignor to The Bendix Corporation

Filed Aug. 5, 1969, Ser. No. 847,597
Int. Cl. F02d *7/00*
U.S. Cl. 123—119 **4 Claims**



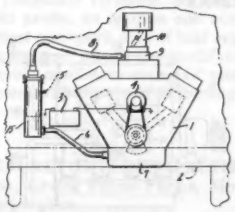
A timed low-pressure fuel injection system of the type injecting discrete intermittent squirts of fuel at several low-pressure engine locations in timed relation to the rotational cycle of an internal combustion engine. The invention is particularly characterized by the use of positively driven bistable fluidic elements to perform the fuel injection function and timed pulse generating means to drive the bistable elements to their injecting and noninjecting or off states.

3,587,544

ENGINE VAPOR RECYCLING DEVICE WITH INTERNAL TEMPERATURE REGULATION

Cecil W. Miles, Green Bay, Wis., assignor to Green Bay Research Corporation, Green Bay, Wis.

Filed Oct. 27, 1969, Ser. No. 869,645
Int. Cl. F02f *9/02*; **F02n** *17/02*; **F02m** *31/00*
U.S. Cl. 123—119 **11 Claims**



An engine vapor recycling device having valve balls slideable in a sleeve and which may stick at low temperatures. The balls are prevented from sticking by controlling the temperature thereof when the engine is off. This may be accomplished by an insulating casing, or by a thermostat controlled heating coil. Starting of the engine will cause the thermostat to shut off an operating coil.

3,587,545

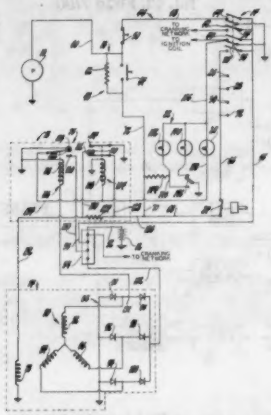
FUEL PUMP SAFETY CIRCUITRY

Richard P. Ballou, Howell, Mich., assignor to General Motors Corporation

Filed Aug. 4, 1969, Ser. No. 847,310
Int. Cl. F02m *19/00*
U.S. Cl. 123—136 **20 Claims**

Vehicle circuitry having provisions for increasing the fuel transfer capability of a fuel pump when starting an engine, preventing the fuel pump from transferring fuel to the engine when the engine is flooded, operating the fuel pump at a plu-

rality of speeds in accordance with the engine throttle setting, advising a vehicle operator that the engine oil pressure in the vehicle is insufficient to properly lubricate the engine by energizing a telltale network that is normally used to monitor various other conditions in the vehicle, stopping the



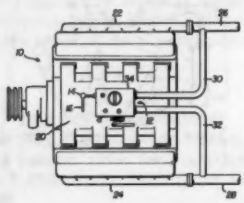
engine by removing its supply of fuel when the engine loses oil pressure and permitting the vehicle operator to temporarily maintain the supply of fuel to the engine when the engine loses oil pressure by manipulating an ignition switch, checking the operativeness of the telltale network by completing current paths to ground through a plurality of telltales and a generator field winding when the engine is stopped and the ignition switch is in an engine on setting, and energizing a generator telltale when a rectifier in a rectifier network is inoperative and the ignition switch is in an engine off setting.

3,587,546

PRESSURIZED FUEL METERING DEVICE

De Witt M. Fessenden, 911 Summit Blvd., West Palm Beach, Fla.

Filed Nov. 21, 1968, Ser. No. 777,659
Int. Cl. F02d *9/00*
U.S. Cl. 123—139AX **2 Claims**



A device for supplying metered amounts of fuel and air to a mixer or blender which in turn supplies the fuel-air mixture to an internal combustion engine. When the engine is running, fuel is pumped under positive pressure through the device, and when the engine is off, back pressure prevents leakage of fuel.

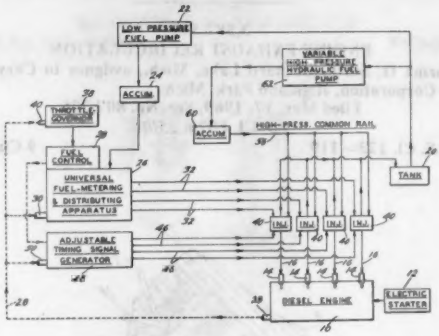
3,587,547

FUEL INJECTION SYSTEM AND APPARATUS FOR USE THEREIN

Russel B. Hussey, East Longmeadow, Mass.; John A. Kimberley, Granby, Conn., and Warren E. Snyder, Wilbraham, Mass., assignors to AMBAC Industries, Incorporated, Springfield, Mass.

Filed July 9, 1969, Ser. No. 840,266
Int. Cl. F02d *1/06*
U.S. Cl. 123—139 **10 Claims**

A "universal" fuel injection system adaptable for use with any of a variety of types of diesel engines, in which the timing and duration of the fuel injection intervals, as well as the quantity of fuel injected, can readily be selected or adjusted to suit the requirements of any of said engines. A separate fuel injector for each cylinder of the engine is supplied with discrete metered quantities of fuel and a piston discharges the fuel through a nozzle in response to high pressure from a common rail, upon actuation by an electrical timing signal. The timing signal is controllable, as is the source of the me-



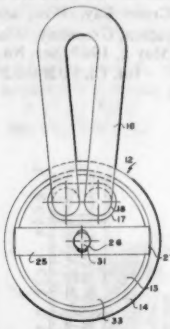
tered fuel, thereby to permit independent selection and adjustment of timing and fuel quantity, and variation of the common rail pressure produces an inverse variation in the duration of each injection discharge. Injection accuracy and efficiency are enhanced, and secondary injection avoided, by use of a spill-collecting accumulator connected to the fuel chamber in each injector to receive the spill at the end of the injection stroke and return the spill to the chamber before the next injection operation.

3,587,548

AUTOMOTIVE BLOCK HEATER

Walter Henry Wernicke, Winnipeg, Manitoba, Canada, assignor to James B. Carter Ltd., Winnipeg, Manitoba, Canada

Filed May 27, 1969, Ser. No. 828,240
Int. Cl. F02n *17/02*
U.S. Cl. 123—142.5 **8 Claims**



An adapter carries the heating element and has a sealing ring around the perimeter. A bowed steel spring is forced into biting engagement with the wall of the frost plug aperture by tightening a cap screw passing through the center of the spring thus straightening it as the screw is tightened.

3,587,549

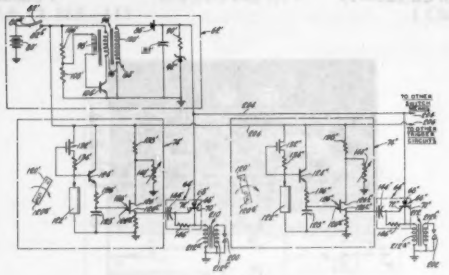
IGNITION SYSTEM

Earl R. Kebbon, and Joel N. Ashcraft, Columbus, Miss., assignors to AMBAC Industries, Incorporated, Columbus, Miss.

Filed Feb. 18, 1969, Ser. No. 800,139
Int. Cl. F02p *3/06*
U.S. Cl. 123—148 **7 Claims**

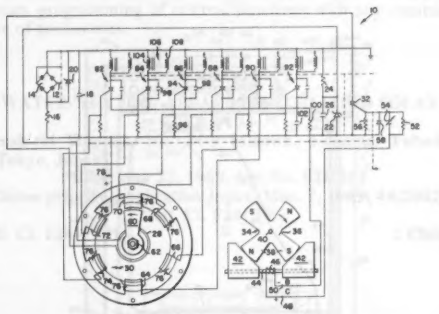
An ignition system for an engine is provided including a source of voltage, engine fuel ignition means and controllable

switch means for selectively completing a circuit with the source of voltage and the engine fuel ignition means, the switch means including magnetically sensitive semiconductive means responsive to a magnetic field for actuating the



switch means to complete the circuit. A magnetic rotor is employed for producing a magnetic field, the magnetically sensitive semiconductive means being responsive to the magnetic field of the rotor.

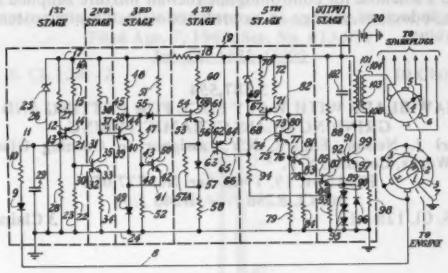
3,587,550
ELECTRONIC IGNITION CONTROL SYSTEM
Richard Zechlin, Beloit, Wis., assignor to Fairbanks Morse Inc., New York, N.Y.
Filed May 16, 1969, Ser. No. 825,275
Int. Cl. F02p *3/06*
U.S. Cl. 123—148 **17 Claims**



The electronic ignition control system includes a magnetic timing pulse source driven in correlation to the crankshaft of an engine which generates timing pulses to control the interval during which an ignition trigger pulse is applied to a rotating transformer distributor. The transformer distributor is also driven in fixed relationship to the engine crankshaft, and operates to couple the trigger pulse to a power switch for a selected engine cylinder. The power switch, upon receipt of a trigger pulse, passes power from a power circuit to an ignition coil, while a biasing voltage is applied to prevent operation of the power switches for the remaining engine cylinders.

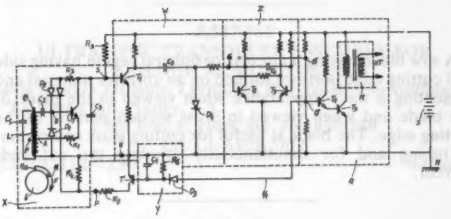
3,587,551
ELECTRONIC IGNITION CIRCUIT
Charles Richard Harrow, Sayreville, N.J., assignor to Solitron Devices, Inc., Tappan, N.Y.
Filed Oct. 29, 1968, Ser. No. 771,526
Int. Cl. F02p *3/02*
U.S. Cl. 123—148E **2 Claims**

An electronic ignition circuit in which an electric pulse produced by a magnetic pickup distributor is utilized to



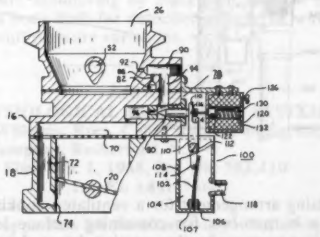
trigger a power circuit to charge and fire an ignition coil.

3,587,552
AUTOMATIC ADVANCE ELECTRONIC IGNITION DEVICE FOR INTERNAL COMBUSTION ENGINES
Bernard Varaut, Draveil, France, assignor to Compagnie Des Compteurs, Paris, France
Filed Nov. 29, 1968, Ser. No. 780,046
Claims priority, application France, Nov. 30, 1967, 130310
Int. Cl. F02p *3/02*
U.S. Cl. 123—148 **6 Claims**



The electronic automatic ignition advance adjustment device for internal combustion engine comprises conductor elements spaced out and moved by said engine depending on its rotation speed, an electromagnetic probe P detecting the passage of said conductor elements, an oscillating assembly connected to said probe, an ignition coil connected, on the one hand, to at least one spark plug of said engine and to said oscillating assembly, and means for modifying the time for setting up the stable oscillatory rating of said oscillating assembly in agreement with the speed of the engine.

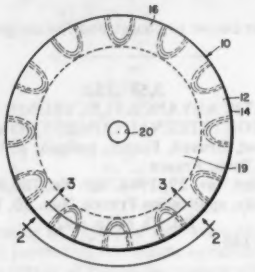
3,587,553
CARBURETOR PRIMING SYSTEM
Robert W. Sutton, Grosse Pointe Farms, Mich., assignor to The Bendix Corporation
Filed July 24, 1969, Ser. No. 844,359
Int. Cl. F02m *1/06, 1/10*
U.S. Cl. 123—180E **4 Claims**



A priming system for float-type carburetors, in which a fuel enrichment passage connects the float chamber with the induction passage on the engine side of the throttle valve and an air passage connects the fuel enrichment passage with the induction passage near the air intake thereof. A valve

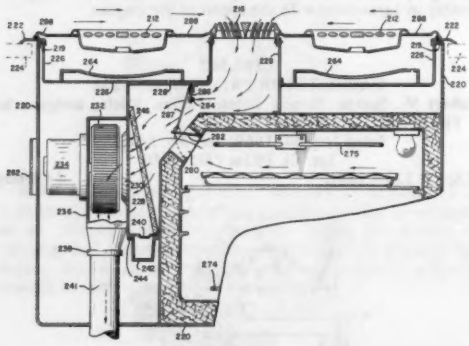
disposed in the fuel enrichment passage posterior to the air passage is automatically controlled by a bimetallic element and a solenoid for controlling the fuel-air mixture supplied to the induction passage in accordance with the engine temperature.

3,587,554
SAW BLADE WITH WAVY EDGE FOR CUTTING AND GRINDING GLASS CERAMIC TUBING
Carl J. Nelson, Elmira, N.Y., assignor to Corning Glass Works, Corning, N.Y.
Filed Nov. 19, 1968, Ser. No. 777,056
Int. Cl. B28d *1/04*; B24d *7/00*
U.S. Cl. 125—15 **3 Claims**



A saw blade having a circular peripheral region having side and cutting edge portions formed on an abrasive material and presenting a wavy appearance when viewed in the plane of the blade and when viewed in cross section parallel to the cutting edge. The blade is useful for cutting glass and ceramic tubing and for simultaneously grinding the cut ends thereof.

3,587,555
VENTILATED RANGE
Joseph J. Cerola, Indianapolis, Ind., assignor to Jenn-Air Corporation, Indianapolis, Ind.
Filed May 13, 1969, Ser. No. 824,043
Int. Cl. F24c *1/00*, *15/20*
U.S. Cl. 126—1 **4 Claims**

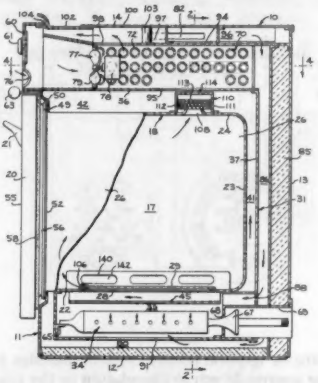


A housing arrangement for a ventilated cooking range including a burner box for containing surface level heating units and/or open air broiler, an air exhaust plenum chamber extending through and bisecting the burner box for communication with an air exhaust fan for expelling smoke and grease laden fumes to the outside of a building wall, and an oven or an oven provided with an enclosed broiler which is in venting communication with the plenum chamber.

3,587,556
SELF-CLEANING COOKING DEVICE
William C. Moreland, II, Export, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Dec. 7, 1967, Ser. No. 688,712
Int. Cl. A21b *1/00*
U.S. Cl. 126—19 **9 Claims**

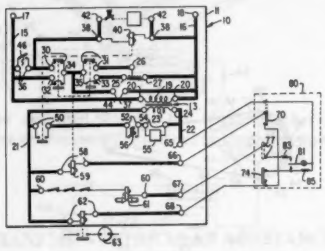
A cooking device in which the walls thereof have an oxidizing catalytic coating in the form of a built-up layer preferably applied as a glass frit-catalyst mixture and partially fused to form a porous matrix layer bonded to the base enamel layer of the wall with the catalyst dispersed throughout the matrix.

3,587,557
SELF-CLEANING GAS OVEN
Wayne L. Henderson, and Raymond L. Dills, Louisville, Ky., assignors to General Electric Company
Filed Sept. 22, 1969, Ser. No. 859,860
Int. Cl. F24c *15/32*
U.S. Cl. 126—21A **14 Claims**



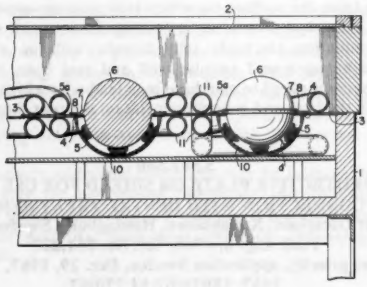
A gas cooking oven where a main stream of the hot flue gases generated in the lower combustion chamber is passed around the outside of the oven liner, while a secondary stream of flue gases passes completely through the oven liner and then rejoins the said main stream before the flue gases are passed through a heat exchanger for extracting some of the heat therefrom. Cool room air is drawn into the oven cabinet and passed through the heat exchanger to extract some of the heat from the hot flue gases. Air passages are formed in heat transfer relation with the outer walls of the oven cabinet, and the heated air passes through the passages and picks up more heat from the walls of the cabinet before passing into the combustion chamber as preheated secondary air for the gas burner means. Some cool air bypasses the heat exchanger and passes directly to the oven cabinet, while other cool air mixes with the flue gases discharging from the heat exchanger to cool the gases further before the gases are returned to the kitchen atmosphere.

3,587,558
FURNACE HAVING MULTIPLE SPEED MOTOR AND ACCESSORY CONTROL SYSTEM
William F. Raleigh, Hacienda Heights, Calif., assignor to Carrier Corporation, Syracuse, N.Y.
Filed May 23, 1969, Ser. No. 827,223
Int. Cl. F24h 9/14
U.S. Cl. 165—113 1 Claim



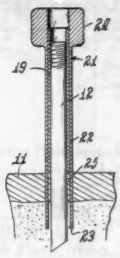
A heating and cooling system including a furnace having a control module comprising a prewired printed circuit board having a pair of line voltage conductors connected to the primary winding of a power transformer and a pair of low voltage conductors connected to the secondary winding of a power transformer. Terminal means are provided for connecting a plug-in fan relay and a thermostat in the low voltage circuit. Additional terminal means are provided for connecting a fan motor and a humidifier and humidifier relay to the line voltage circuit. Terminal means are also provided in conjunction with a double-pole, double-throw fan motor relay switch for connecting an air cleaner accessory unit to the circuit. The circuit is arranged to provide the desired optimum programming of control functions with any combination of accessories.

3,587,559
WATER-HEATING APPARATUS UTILIZING SOLAR RAYS
Kenshichi Wonaka, No. 24-9 Minown, 1-chome, Taito-ku, Tokyo, Japan
Filed May 22, 1969, Ser. No. 826,855
Claims priority, application Japan, Mar. 7, 1969, 44/20023
Int. Cl. F24j 3/02
U.S. Cl. 126—271 2 Claims



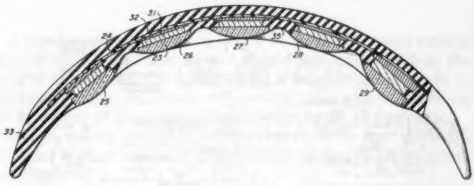
An apparatus for heating water by solar rays in which a plurality of spherical lenses are used to enable solar rays to be converged whenever there is sunlight present. Also incorporating a superheat resisting carbon impregnated cloth to cover that area of metal which is subjected to the intensive heat of the focused rays.

3,587,560
BIOPSY INSTRUMENT AND METHOD OF OBTAINING BIOPSY
Jacob A. Glassman, 1680 Meridian Ave., Miami Beach, Fla.
Filed Apr. 7, 1969, Ser. No. 813,874
Int. Cl. A61b 10/00
U.S. Cl. 128—2 10 Claims



A biopsy instrument comprised of an inner tubular bone piercing needle for obtaining a bone marrow specimen, and an outer tubular bone penetrating needle, the latter having saw teeth on its effective end for severing a specimen of bone; and the method of obtaining marrow and bone specimens for biopsy study.

3,587,561
ULTRASONIC TRANSDUCER ASSEMBLY FOR BIOLOGICAL MONITORING
Janis Gunars Ziedonis, Levittown, Pa., assignor to Hoffmann-La Roche Inc., Nutley, N.J.
Filed June 5, 1969, Ser. No. 830,750
Int. Cl. A61b 5/02
U.S. Cl. 128—2.05 9 Claims

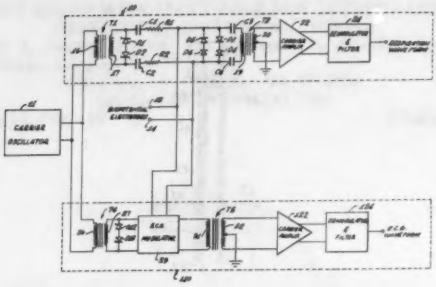


An ultrasonic transducer assembly for use with a human or an animal body, comprising a flexible printed circuit means having a preset curvature, for supporting an array of ultrasonic transducer units electrically connected to the printed circuit for irradiating a selected section of a body with ultrasonic energy and focusing the reflected transmitted ultrasonic energy. The transducer assembly is usable for blood pressure monitoring by placement with an inflatable cuff about a body limb for detection of arterial wall motion induced by cuff pressure variations.

3,587,562
PHYSIOLOGICAL MONITORING SYSTEM
Andrew S. Williams, Brea, Calif., assignor to Becton, Dickinson and Company, Rutherford, N.J.
Filed Feb. 1, 1968, Ser. No. 702,410
Int. Cl. A61b 5/04
U.S. Cl. 128—2.06 8 Claims

Electrical apparatus for simultaneously monitoring respiration and cardiac action from a common pair of biopotential electrodes applied to a living subject, to obtain independent respiration and ECG (cardiac) electrical output signals. The respiration signal representing tidal volume impedance changes in the lungs of the subject modulates a constant current high frequency carrier signal and is subsequently am-

plified, demodulated and filtered in a respiration channel. ECG potentials existing between the common pair of biopotential electrodes are filtered from the modulated high frequency carrier voltage and the filtered ECG signal is then



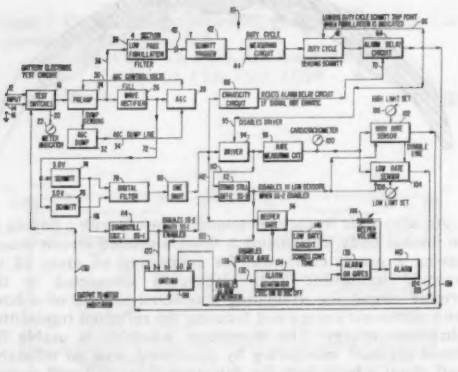
used to modulate a high frequency carrier signal originating from the same source supplying the respiration channel. The ECG modulated carrier is subsequently amplified, demodulated and filtered in a cardiac channel.

3,587,563

HEARTBEAT MONITOR

Charles W. Ragsdale, Takoma Park, Md., assignor to the United States of America as represented by the Secretary of the Army

Filed Jan. 8, 1969, Ser. No. 789,694
Int. Cl. A61b *5/04*
U.S. Cl. 128—2.06A **11 Claims**



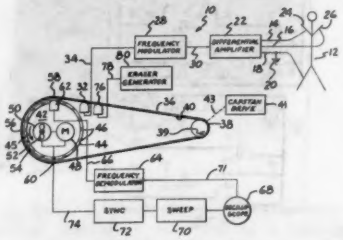
Disclosed is an electronic heart monitor for monitoring electrocardiograph waveforms of a human heart. The unit is lightweight, battery operated, and usable over a wide temperature range so as to satisfy military requirements. It indicates high and low heart rates, fibrillation, arrest, excess noise, average heart rate and low battery potential, all in a manner requiring no extensive interpretation by trained personnel. The heartbeat monitor comprises input terminals for coupling to a source of electrocardiogram waves, and alarm, and a fibrillation sensing circuit for coupling the input terminals to the alarm such that the alarm is actuated by the sensing circuit whenever a fibrillation waveform is applied to the input terminals. The fibrillation sensing circuit comprises means for sensing the duty cycle of an electrocardiogram wave expending beyond predetermined maximum and minimum values.

3,587,564

VITAL PULSE DISPLAY AND DISPLAY PROCESS EMPLOYING A REPETITIVE SCANNING TAPE SYSTEM TO MINIMIZE DISPLAY FLICKER

William K. Hagan, Palatine, and Thomas H. Burdick, Villa Park, Ill., assignors to Baxter Laboratories, Inc., Morton Grove, Ill.

Filed Jan. 17, 1969, Ser. No. 792,032
Int. Cl. A61b *5/04*
U.S. Cl. 128—2.06R **28 Claims**



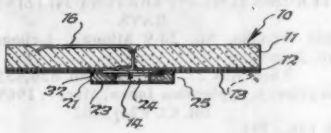
A physiological pulse display means and process features a tape loop recording system with a stationary record head and a repetitively scanning read head moving at a higher speed than the tape whereby the usual flicker on the oscilloscope screen is reduced.

3,587,565

DISPOSABLE ELECTRODE

George Tatoian, Williamsville, N.Y., assignor to Cardiac Electronics, Inc., Clarence, N.Y.

Continuation of application Ser. No. 586,691, Oct. 14, 1966, now abandoned. This application Aug. 25, 1969, Ser. No. 852,992
Int. Cl. A61b *5/04*
U.S. Cl. 128—2.06 **4 Claims**



A disposable electrode having a foamlike base with pressure-sensitive adhesive on one surface, an annular well projecting from the surface on which said pressure-sensitive adhesive is located, a conduit in communication with said well for conducting electrode jelly thereto with an electrode located between said annular well and said base, the electrode being secured to said base by a lead wire which extends through the base and is bent over flat on the rear thereof.

3,587,566

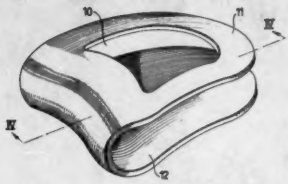
PROTECTIVE PLATE OR SHIELD FOR USE IN CONNECTION WITH DENTAL TREATMENT

Gunnar Oscarsson, Kullaplatsen, Halsingborg, Sweden

Filed Aug. 8, 1968, Ser. No. 751,227
Claims priority, application Sweden, Dec. 29, 1967, Aug. 8, 1967, 18071/67;11,270/67
Int. Cl. A61b *1/00*
U.S. Cl. 128—12 **4 Claims**

A mouth shield to be positioned in the corner of the mouth of a dental patient during treatment to protect the cheek, lips, and corner of the mouth from dental instruments and medicants comprising a central member for contacting the corner of the patient's mouth and inner and outer members for gripping the patient's cheek, the three members forming a substantially U-shaped cross section. The central member is

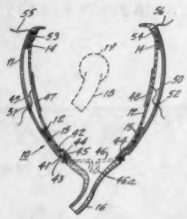
shaped to conform to the corner of the mouth. The inner member has a convex surface facing the outer member and the outer member has a concave surface facing the inner member. The distance between the inner member and the outer member decreases from the central member toward the free ends.



3,587,567
MECHANICAL VENTRICULAR ASSISTANCE ASSEMBLY

Peter Paul Schiff, 5812 Morris St., Philadelphia, Pa.

Filed Dec. 20, 1968, Ser. No. 785,652
Int. Cl. A61h 29/00
U.S. Cl. 128—24.5 14 Claims



A mechanical ventricular assistance apparatus comprised primarily of a ventricular assistor cup having a configuration generally conforming to the surface configuration of the ventricles of the heart. The cup is formed of a rigid or nonresilient material and includes a flexible liner or diaphragm. The rigid outer shell is provided with an open end for receiving the ventricles and first and second ports for selective coupling to pressure or vacuum systems. The diaphragm is secured about the open end and is further secured adjacent one of the two ports. At least one electrode is provided in the region of one of said ports for the application of signals to carry out fibrillation or defibrillation of the heart. In the case where it is desired to provide mechanical assistance of the heart pumping action in synchronism with normal heart rhythm the electrode may be employed for monitoring the electrocardiac signals and hence for operating the mechanical pumping action in synchronism with the normal heart rhythm.

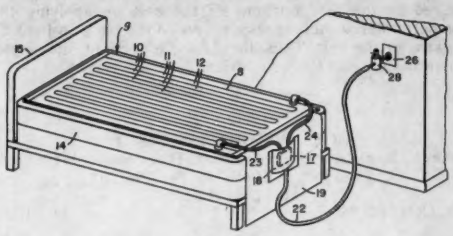
Alternatively additional electrodes may be mounted within the assembly for performing fibrillation and defibrillation functions which electrodes are positioned a spaced distance away from said first mentioned electrode and along said diaphragm.

3,587,568
INFLATABLE MATTRESS APPARATUS

Eugene P. Thomas, Baltimore, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 20, 1965, Ser. No. 488,430
Int. Cl. A61h 1/00
U.S. Cl. 128—33 16 Claims

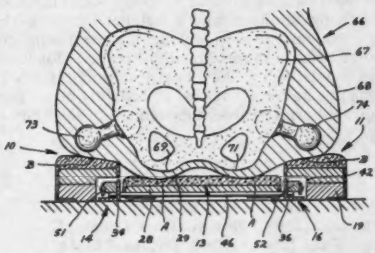
An inflatable mattress apparatus wherein different cells are alternately inflated and deflated in out-of-phase relationship under control of a pure fluid selector valve device.



3,587,569
DROP SEAT

Lorrin H. Madsen, Maple Plain, Minn., assignor to American Rehabilitation Foundation, Inc., Minneapolis, Minn.

Filed Oct. 14, 1968, Ser. No. 767,243
Int. Cl. A61h 1/00
U.S. Cl. 128—33 9 Claims



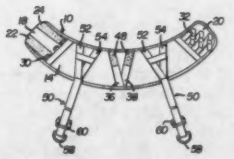
A mechanical drop seat having a vertically movable central seat member. A slide and lever mechanism connected to the central seat member is operated by a hand movable lever to selectively raise and lower the central seat member to vary the locations of the pressures on the posterior of a person.

The invention described herein was made in the course of, or under a grant with the Department of Health, Education, and Welfare.

3,587,570
PELVIC TRACTION BELT

Robert W. Kilbey, P. O. Box 345, DeFuniak Springs, Fla.

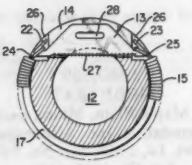
Filed Sept. 17, 1968, Ser. No. 760,193
Int. Cl. A61h 1/02
U.S. Cl. 128—75 7 Claims



A pelvic traction device including a belt of flexible material to be worn at the pelvic area of a person and having end portions constituting the front of the belt, a central back portion and two side portions on opposite sides of the back portion. Pads of fastener material for a fabric fastener are affixed respectively to the back portion and the two side portions. Pulling straps are provided with fastener material complementary to that on the belt. For a single-pull belt, one

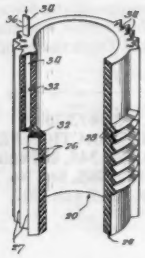
strap is secured to the back portion of the belt by applying the fastener material of the strap to the pad on the belt's back portion. For a double-pull traction belt, two straps are secured to the side portions of the belt by applying the fastener material thereof respectively to the pads on the side portions of the belt. Thus, the device is a composite single-pull or double-pull traction device.

3,587,571
HORN WEIGHT ASSEMBLY
James K. Daniels, Owl Creek Route, Thermopolis, Wyo.
Filed Feb. 5, 1969, Ser. No. 796,761
Int. Cl. A61f *05/00*
U.S. Cl. 128—76 **8 Claims**



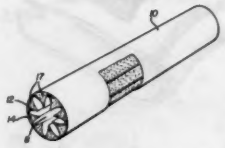
A horn weight assembly has a hollow weighted body arranged to fit on the horn, and a fastener for removably attaching the body to the horn includes a blade having an inner cutting edge slidably mounted within the body together with a resilient band holding the blade firmly in place with the cutting edge being forced against and slightly penetrating the surface of the horn to prevent movement of the body on the horn.

3,587,572
KNEE BRACE
Michael Evans, 2239 E. 98th St., Cook County, Ill.
Filed July 17, 1968, Ser. No. 745,442
Int. Cl. A61f *5/00, 13/00;* **A41d** *13/06*
U.S. Cl. 128—80 **9 Claims**



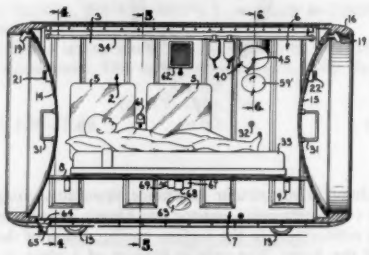
A brace adapted to protect as well as support an injured or weakened knee joint. The brace includes a molded sleevelike article formed from a lightweight elastomeric material and has at least two sets of longitudinal axially extending ribs adapted to overlie and support, respectively, the lateral and medial portions of the knee joint; and a third set of longitudinal ribs extending transversely of said first two sets and adapted to overlie the patella or kneecap portion of said joint. The first two sets of axially extending ribs while providing sufficient rigidity and support for certain purposes, further including a plurality of elongate axially extending pockets having flexible stays removably disposed therein to provide additional support where needed; the degree and location of the support being adjustable through the use of said removable stays.

3,587,573
INHALATION DEVICE WITH RUPTURABLE MICROSCOPIC CAPSULES
John Gene Flack, 6914 Halyard, Birmingham, Mich.
Filed June 20, 1969, Ser. No. 835,162
Int. Cl. A61m *15/08*
U.S. Cl. 128—201 **4 Claims**



An inhalation device utilizing a deformable tube containing absorbent paper which carries microencapsulated treatment material to be inhaled. By squeezing the deformable tube the microcapsules rupture and the treatment material can be breathed to freshen the breath or for medicinal purposes.

3,587,574
HYPERBARIC TREATMENT CHAMBER
James B. Mercer, Merriam, Kans. (13109 W. 75th St., Lenexa, Kans. 66215)
Filed Apr. 14, 1969, Ser. No. 815,660
Int. Cl. A61h *31/00;* **B64d** *13/00*
U.S. Cl. 128—204 **6 Claims**

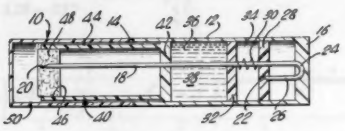


A hyperbaric treatment chamber is formed within an elongated tubular hermetically sealable casing having a pressure sealable door at each end and a floor structure therein and supports in the casing for a patient bed or litter. The casing is sized to enclose a patient's entire body in a prone or supine position on the bed or litter while permitting the patient to assume a sitting position. Valve means are associated with the casing for admitting a selected gas, such as oxygen, under a pressure higher than atmospheric into the casing interior to provide a selected stable pressure atmosphere with desired gas, such as up to one hundred percent (100%) oxygen, around the patient's body. A high pressure sprinkler system for quenching possible fires and medical means for examining and treating the patient are contained within the casing.

3,587,575
SELF-CONTAINED, MOVING NEEDLE SYRINGE WITH HYDRAULIC SAFETY LOCK
Eric S. Lichtenstein, 24 E. 93rd St., New York, N.Y.
Filed Sept. 15, 1969, Ser. No. 857,985
Int. Cl. A61m *5/18*
U.S. Cl. 128—215 **9 Claims**

A syringe for injecting an injectable preparation into a muscle or area of a body other than a vein or artery. The syringe includes a housing having a supply chamber which is adapted to contain the injectable preparation in a tandem arrangement with a vacuum chamber which is fluid-tightly separated from the supply chamber. An elongated hollow

needle extends into the housing and has an outlet end which is adapted to penetrate into the body and through which the injectable preparation discharges, the needle having an inlet for receiving the injectable preparation. Initially, however, this inlet is displaced through the vacuum chamber for reaching the supply chamber. The movement of the inlet of the needle through the vacuum chamber is brought about while the outlet end of the needle penetrates into the body,



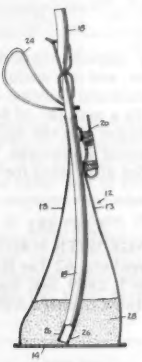
so that if the outlet end of the needle should happen to penetrate into a vein or artery blood will flow in a reverse direction through the needle into the vacuum chamber. The housing contains a hydraulic-type blocking device which responds to the flow of blood into the vacuum chamber for blocking movement of the inlet of the needle into the supply chamber, so that in this way injection of the preparation into a vein or artery is automatically prevented.

3,587,576

APPARATUS FOR GIVING UPPER GASTROINTESTINAL RADIOLOGICAL EXAMINATION

Dan Reikes; James G. Grimes; Carl R. Hale, and Lewis E. Lott, Hattiesburg, Miss., assignors to Howard S. Stern and Philip H. Meyers, Westbury, Long Island, N.Y., fractional part interest to each

Filed Sept. 26, 1968, Ser. No. 762,906
Int. Cl. A61j *7/00*
U.S. Cl. 128—222 **7 Claims**



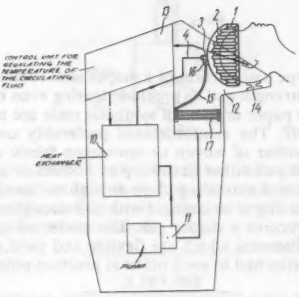
A pouch adapted to hold a barium sulfate suspension which can be drunk from the pouch through a flexible straw that extends from the interior of the pouch to out the top of the pouch. Except for the straw opening, the pouch, when in use, is closed. The pouch has collapsible sides and a stiff bottom to permit alternate uses of the pouch. The stiff bottom permits the pouch to stand up or to be held without compression of the interior, which compression would tend to force the contents out of the straw. Alternatively, the collapsible sides of the pouch permit the administrator of the upper gastrointestinal examination to force the contents of the pouch out the straw into the mouth of a patient who because of age or incapacity may be unable to drink from the straw.

3,587,577

DEVICE FOR APPLYING SELECTIVE AND GENERAL HYPOTHERMY TO AND REHEATING OF HUMAN BODY THROUGH THE COMMON INTEGUMENTS THEREOF

Oleg Alexandrovich Smirnov, ulitsa Solyanka, 1/2, kv.20; Viktor Petrovich Danilov, ulitsa 3 Parkovaya, 52, korpus 1, kv. 23, Moscow, and Vyacheslav Ivanovich Zubkov, Ramensky raion, poselok Ilinskoe, ulitsa Vtoraya Lesnaya, 33, Moskovskaya oblast, U.S.S.R.

Continuation of application Ser. No. 614,262, Feb. 6, 1967, now abandoned. This application Mar. 9, 1970, Ser. No. 17,030
Int. Cl. A61f *7/00*
U.S. Cl. 128—254 **6 Claims**



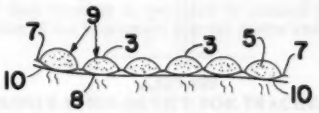
A device is provided for applying selective and general hypothermy to and reheating of a human or animal body through the common integuments thereof, the device being provided with hollow elements made in a shape corresponding to that of the body surface to be treated. A heat-transfer medium is supplied to the hollow elements which are disposed on the side facing the body surface under treatment and are provided with openings facing the body surface to allow heat-transfer medium to emerge in uniformly distributed jets at right angles onto the surface being treated.

3,587,578

PACK FOR APPLYING THERAPEUTIC MOIST HEAT

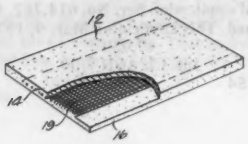
Jack M. Walker, Chattanooga, Tenn., assignor to Chattanooga Pharmacal Company, Chattanooga, Tenn.

Filed Aug. 28, 1968, Ser. No. 755,997
Int. Cl. A61j *3/80*
U.S. Cl. 128—268 **8 Claims**



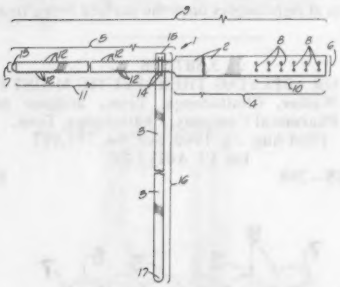
A pack for applying therapeutic moist heat containing a sorptive material between a water and water vapor pervious fabric side placed toward the anatomy of a patient and a water and water vapor impervious material, which is relatively elastic and stretchable compared with the fabric, forming the other side of the bag. The material of the outer side of the bag is a good heat insulator and is molded to form a plurality of troughs so that, when it is sealed to the inner side of the bag, usually a fabric, a plurality of separate compartments holding the sorptive material are formed. Steam or water vapor can escape only through the fabric side toward the anatomy of a patient and heat loss on the outer side of the bag is minimized. Also, the elastic, stretchable, material of the outer side of the bag stretches considerably more than the fabric, thereby enabling the fabric side to be in close contact over most of the area of the fabric with the anatomy of the patient and to bend toward itself on a rather small radius, so as to fit closely around the body parts of small diameter, such as small wrists, arms, ankles and legs.

3,587,579
REINFORCED DIAPER
Reinhardt N. Sabee, 728 S. Summit St., Appleton, Wis.
Filed Oct. 16, 1968, Ser. No. 768,091
Int. Cl. A61f 13/16
U.S. Cl. 128—287 9 Claims



The fluff-type pad portion of a diaper is so reinforced as to increase pin strength and to preclude tearing even if extremely lightweight paper or films of synthetic resin are used to enclose the fluff. The reinforcement preferably comprises a scrim made either of woven or nonwoven fabric and incorporated in the pad either at the top or bottom or at an intermediate level and extending close enough to the side or end margins of the diaper to connect with and strengthen the portions which receive a diaper pin. The preferred scrim comprises monofilaments which are flexible and yield under tension and are attached to each other at junction points.

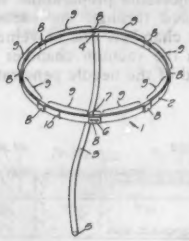
3,587,580
TWO-PIECE SANITARY BELT
John Leslie Jones, Sr., 1070 Glen Oaks Blvd., Pasadena, Calif.
Filed Apr. 7, 1969, Ser. No. 814,007
Int. Cl. A61f 13/16
U.S. Cl. 128—291 4 Claims



This invention teaches a simple two-piece sanitary napkin support belt formed of elastomeric plastic film, and useful for supporting a menstrual napkin in a functional position on a female torso. A single support belt can fit a majority of female torso sizes with minimum mechanical adjustments. The belt is sufficiently low cost to be discarded after use for one menstrual period.

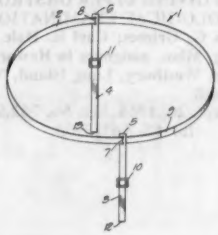
3,587,581
ONE PIECE SANITARY BELT
John Leslie Jones, Sr., 1070 Glen Oaks Blvd., Pasadena, Calif.
Filed Apr. 7, 1969, Ser. No. 814,008
Int. Cl. A61f 13/16
U.S. Cl. 128—291 2 Claims

This invention teaches a simple one piece sanitary napkin support belt formed of elastomeric plastic film and useful for supporting a menstrual napkin in a functional position on a female torso. A single support belt can fit a majority of female torso sized with minimum mechanical adjustments.



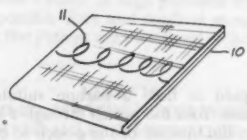
The belt is sufficiently low cost to be discarded after using for one menstrual period.

3,587,582
SANITARY NAPKIN SUPPORT BELT
John Leslie Jones, Sr., 1070 Glen Oaks Blvd., Pasadena, Calif.
Continuation-in-part of application Ser. No. 814,008, Apr. 4, 1969. This application Oct. 24, 1969, Ser. No. 869,241
Int. Cl. A61f 13/16
U.S. Cl. 128—291 5 Claims



A simple sanitary napkin support belt is formed of elastomeric plastic film, and it is useful for supporting a menstrual napkin in a functional position on a female torso. A single waist belt can fit a majority of female torso sizes with no mechanical adjustment and the napkin support straps fit with minimum mechanical adjustment. The belt is sufficiently low cost to be discarded after using for one menstrual period.

3,587,583
SURGICAL SPONGE WITH MAGNETIZED MEANS
Irving Melbourne Greenberg, 62 The Hemlocks, Roslyn, N.Y.
Filed July 7, 1969, Ser. No. 839,206
Int. Cl. A61f 13/00
U.S. Cl. 128—296 8 Claims



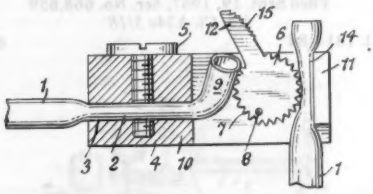
A surgical sponge having magnetized means associated therewith, preferably in the form of a flexible thread having magnetized particles therein, which is readily detectable during a checkout procedure prior to the termination of surgery. The checkout procedure employs a means for detecting and locating the sponge by its magnetized means as well as surgical instruments which have a magnetized material embedded therein, and which detection means may be interconnected

with a recording apparatus so that a permanent record of the checkout may be retained.

3,587,584
INFLATABLE TORNIQUET
Donald D. Keller, Bourbon, Ind., assignor to Orthopedic Equipment Company, Bourdon, Ind.
Filed Dec. 26, 1968, Ser. No. 787,123
Int. Cl. A61b *17/12*
U.S. Cl. 128—327 **9 Claims**

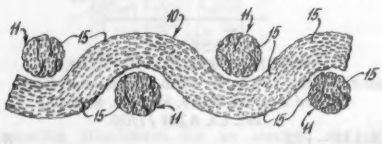
An inflatable tourniquet including an elongated flexible tube having a bladder part and an adjoining strap part. The bladder and strap parts are adapted to encircle the limb of a patient with the bladder part being positioned against the limb and the strap part being wrapped over the bladder part. Releasable securement means are provided for preventing unwrapping of the strap part. The bladder part includes an inlet through which a fluid is introduced to inflate the bladder part.

3,587,585
TOURNIQUETS
Frank J. Ceravolo, 4701 N. Federal Highway, Fort Lauderdale, Fla.
Filed Feb. 28, 1969, Ser. No. 803,305
Int. Cl. A61b *17/12*
U.S. Cl. 128—327 **3 Claims**



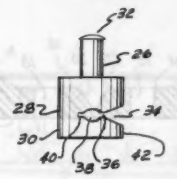
A tourniquet comprising a coupling body which fixedly receives one end of a band or encircling member such as a rubber tube or the like. The opposite end portion of the body adjustably receives the other end of the band and an eccentrically pivoted pawl engages and clamps said end of the band between it and an end wall on the body. The pawl is biased or urged in a direction toward said wall by a projecting springy end portion of the fixedly secured end of the band which acts as a pressure finger against the pawl. A projecting finger piece on the pawl permits its release from clamping position.

3,587,586
POROUS COLLAGEN ANASTOMOTIC CUFF
Richard L. Kronenthal, Fair Lawn, N.J., assignor to Ethicon, Inc.
Filed Mar. 15, 1968, Ser. No. 713,325
Int. Cl. A61b *17/11*
U.S. Cl. 128—334 **4 Claims**



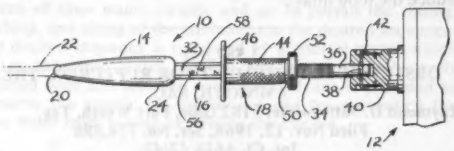
A tubular prosthesis useful in the anastomosis of blood vessels is prepared by weaving collagen strands to form a tubular fabric and immersing this structure in an aqueous acid solution containing acid-swollen collagen fibrils to swell said collagen strands. The tubular structure is then removed from the swelling solution and lyophilized to form a spongelike tubular structure.

3,587,587
BOBBIN HOLDER FOR SUTURING DEVICE
Henry Raskin, 410 N. Woodward, Holly, Mich.
Filed Dec. 26, 1968, Ser. No. 787,072
Int. Cl. A61b *17/06;* **B65h** *75/42, 49/26*
U.S. Cl. 128—340 **1 Claim**



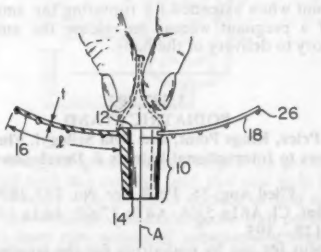
A plastic bobbin holder of resilient material transversely channeled and laterally slotted to snap upon and fit over one of the arms of a needle suturing forceps to provide a continuous supply of suture material.

3,587,588
CERVIX DILATING INSTRUMENT AND METHOD
William C. Murr, Piedmont, Calif., assignor to Bio-Engineering, Inc.
Filed Sept. 9, 1968, Ser. No. 758,256
Int. Cl. A61m *29/00*
U.S. Cl. 128—341 **5 Claims**



A dilation instrument and procedure for dilating the cervix of the human uterus. The instrument is of generally cylindrical cross-sectional configuration and diverges radially outwardly from its distal end, with a maximum taper adjacent its end, and a diminishing taper along its length. The instrument is releasably connected to a vibrating tool to cause longitudinal reciprocating vibratory motion to be imparted. An adjustable stop member is provided to control the depth of penetration of the instrument into the cervix and uterus.

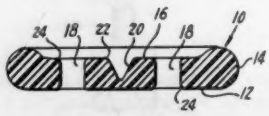
3,587,589
DECANNULATION DEVICE FOR TRACHEAL TUBE
Merrill L. Ebner, Arlington, Mass., assignor to Carpenter and Paterson Inc., Cambridge, Mass.
Filed Feb. 10, 1969, Ser. No. 797,827
Int. Cl. A6/m *25/00*
U.S. Cl. 128—351 **2 Claims**



Decannulation device comprising plug and integrally molded sideways extending flexible wing member. Shown are

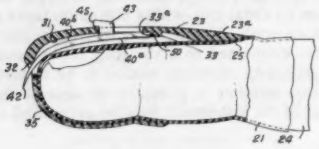
a pair of opposite wing members which may be flexed together for pulling the plug endwise out of the tracheotomy tube. Crosswise extending ridges on wing members of strip form provide finger grips without impeding flexing.

3,587,590
DEVICE FOR DISCOURAGING SMOKING AND OVEREATING
Elizabeth G. Hastings, P. O. Box 514, Half Moon Bay, Calif.
Filed Aug. 1, 1968, Ser. No. 749,508
Int. Cl. A61j *17/00*
U.S. Cl. 128—359 **1 Claim**



A buttonlike device formed of an inert, nontoxic material and preferably possessing a slight degree of resiliency, may be formed of any suitable material such as neoprene. The device is held in the mouth and the user manipulates the device, moving it around in the mouth as would be done, for example, in the case of a hard candy mint. The user will subconsciously also bite the device from time to time and the making of the device of a material possessing some degree of resiliency prevents it from harming the tooth enamel. This supplies a need for occupying the tongue and teeth and tends to satisfy a craving, for example, for cigarettes and assists the user in reducing the number of cigarettes smoked or completely overcoming the smoking habit. The same theory applies for people who are on diets and are endeavoring to reduce the food intake.

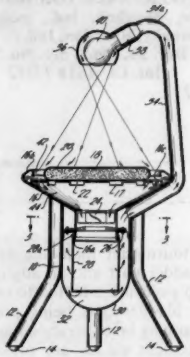
3,587,591
OBSTETRICAL INSTUMENT FOR RUPTURING THE AMNIOTIC SAC
Raymond D. Satterwhite, 5182 Ollie, Fort Worth, Tex.
Filed Nov. 12, 1968, Ser. No. 774,888
Int. Cl. A61b *17/42*
U.S. Cl. 128—361 **13 Claims**



An obstetrical instrument formed integral with a finger of a surgical glove including a flexible sheath along the back surface of a finger of the glove, a movable flexible blade enclosed in the sheath and extendable by a button projecting through a slot along the top face of the sheath engageable by the palm side of an adjacent finger, the blade having an exposed point when extended for rupturing the amniotic membrane of a pregnant woman to release the amniotic fluid preparatory to delivery of the baby.

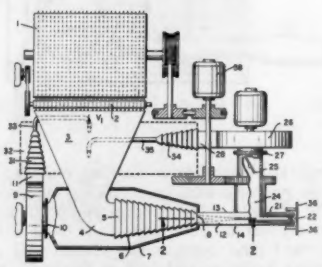
3,587,592
PODIATRIC STAND
Howard Price, Kings Point, and Bela Szilagyi, Flushing, N.Y., assignors to International Patents & Development Corporation
Filed Aug. 16, 1968, Ser. No. 753,289
Int. Cl. A61n *5/06;* **A47b** *37/00;* **A61a** *15/00*
U.S. Cl. 128—395 **9 Claims**

Apparatus for use by podiatrists for the treatment of feet. The patient's foot is supported by a pillow located in the path of an airstream rendered bacteria free through a germicidal lamp. Dust particles or particles originating from the patient's foot, which may enter the airstream, become trapped



and removed from the airstream while the latter is recirculated in bacteria-free form. The airstream is maintained by a fan mounted below the supporting pillow.

3,587,593
METHOD AND APPARATUS FOR PRODUCING A TOBACCO ROD
Friedrich Wilde, and Johannes Herrmann, Dresden, Germany, assignors to VEB Tabak-Und Industriemaschinen Dresden, Dresden, Germany
Filed Sept. 19, 1967, Ser. No. 668,859
Int. Cl. A24c *5/18*
U.S. Cl. 131—84 **6 Claims**

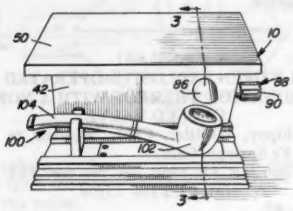


Method and apparatus for manufacturing cigarette rods wherein a stream of shredded tobacco is moved from a pneumatically assisted supply into a groove provided at the periphery of a suction wheel, the velocity and direction of movement of the stream of tobacco fibers being regulated so as to cause the same to impinge the groove so that the building plane formed at the point of intersection of the tobacco stream and the end of the tobacco rod being formed, has a predetermined inclination, tangent to the innermost part of the groove located at the periphery of the wheel, at the point where the plane intersects this groove forming a predetermined acute angle α, whereby the fibers become layered to form a uniformly dense and homogeneous tobacco rod structure with the fibers thereof assuming primarily a position located at the acute angle α with respect to the axis of the tobacco rod.

3,587,594
SMOKING PIPE CONDITIONER
Herman F. Keller, 132 S. W. Fifth St., Newton, Kans.
Filed Dec. 29, 1969, Ser. No. 888,472
Int. Cl. A24f *11/00*
U.S. Cl. 131—172 **8 Claims**

A support for cradling a smoking pipe with its bowl portion opening upwardly and including a blower assembly operable

to blow variable quantities of air down into the bowl of a pipe cradled from the support. The blower assembly includes an electric drive motor and the support includes a normally open pressure sensitive switch which is automatically closed upon the placement of a pipe on the support in position to be



cradled thereby. Further, the pressure sensitive switch is serially disposed in an electrical circuit electrically connecting the electric motor for the blower assembly to a suitable source of electrical potential whereby the blower assembly will be actuated any time a pipe is cradled by the support.

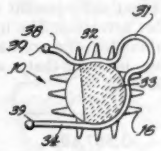
3,587,595
CLIP

Samuel J. Popeil, Chicago, Ill., assignor to Popeil Brothers, Inc., Chicago, Ill.

Division of Ser. No. 693,432, Dec. 26, 1967, Pat. No. 3,480,019, which is a continuation-in-part of application Ser. No. 551,320, May 19, 1966, and a continuation-in-part of 591,939, Sept. 6, 1966, now abandoned. Filed July 30, 1969, Ser. No. 846,182

Int. Cl. A45d *8/00*

U.S. Cl. 132—46 **2 Claims**



A single wire clip with an arcuate clamping portion, yieldable outwardly bent legs for transverse mounting to a hair roller, and a grasping loop integral with the clamping portion.

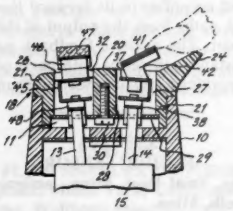
3,587,596
MANICURING ATTACHMENT FOR ELECTRIC DRY SHAVER

Martin J. Wolff, New Haven, Conn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 13, 1969, Ser. No. 790,816

Int. Cl. A45d *29/05*

U.S. Cl. 132- 73.6 **5 Claims**



A manicuring attachment for an electric dry shaver wherein abrasive means for manicuring fingernails is adapted to be moved by the shaver operating means in a predetermined path of travel on a driven member with the abrasive means disposed in a plane inclined to the driven member.

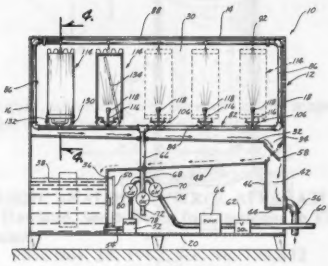
3,587,597
DEVICE FOR WASHING SOFT DRINK SYRUP CONTAINERS

John G. Courtney, 214 West Missouri Ave.; Miles F. Chancellor, RFD #1, both of Memphis, Mo.; Paul R. Chancellor, RFD, Rutledge, Mo., and Kenneth E. Thrasher, Memphis, Mo.

Filed Aug. 28, 1969, Ser. No. 853,709

Int. Cl. B08b *3/02*; **B67c** *1/06*

U.S. Cl. 134—95 **6 Claims**



A device for washing soft drink syrup containers comprising a cabinet having a washing compartment provided therein with a plurality of washing stations mounted therein, each of which are able to support and wash a syrup container mounted thereon. Each washing station is designed so as to wash the exterior and interior of the inverted syrup can mounted thereon. Each washing station is connected to a source of rinse water, caustic and air to permit the rinsing, washing, and airing of the containers in the desired sequence. The desired sequence is regulated by a control means which causes the rinse water, caustic and air to be selectively directed onto and into the containers. Means is provided to conserve the caustic for further use and for preventing the rinse water from mixing or diluting the caustic.

3,587,598
SINK ROLL FOR SUPPORTING AN ELONGATE MATERIAL WITHOUT DIRECT CONTACT

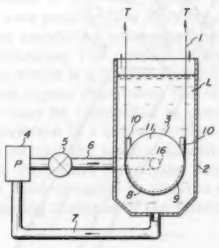
Yasunori Miyamatsu, Yokohama; Yuji Hashimoto, Zushi-shi, and Shoji Enari, Yokohama, Japan, assignors to Toyo Kohan Co., Ltd., Tokyo, Japan

Filed Jan. 14, 1969, Ser. No. 790,921

Claims priority, application Japan, Jan. 30, 1968, Nov. 13, 1968, 43/5148;43/82573

Int. Cl. B08b *3/04*

U.S. Cl. 134—122 **4 Claims**



A sink roll for guiding an elongate strip to be processed in a treating liquid tank in a manner such that said strip is maintained out of contact with the outer surface of said sink roll, comprising a semicircular cylindrical guide wall portion provided with at least one recess of substantially rectangular shape, flat guide wall portions extending from the diametrically opposite edges of said semicircular cylindrical guide

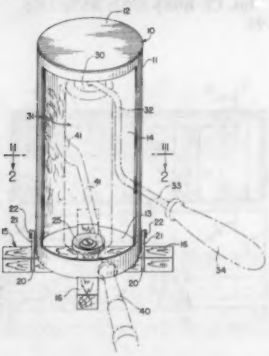
wall portion tangentially thereto, and at least one channel opening in the recess and communicating with a pump to supply the pressurized treating liquid between the surface of the semicircular cylindrical guide wall portion and the strip.

3,587,599

PAINT ROLLER CLEANER

Richard T. Bywater, 115 Country Club Drive, Elmira, N.Y.

Filed Nov. 24, 1969, Ser. No. 879,202
Int. Cl. B08b *3/02*
U.S. Cl. 134—138 **2 Claims**



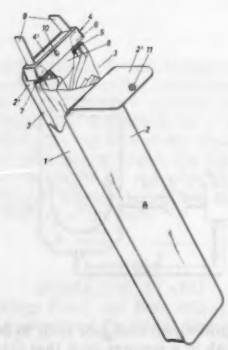
A paint roller cleaner for conventional paint rollers having a point roller element thereon for painting with water soluble paint comprising a closed top open bottom housing having an elongated aperture in one side thereof to admit of the insertion of the roller portion of said paint roller therein, a base formed with drainage apertures therethrough on which said housing is removably fixed, and preferably a cup element rotatably mounted centrally on said base onto which the free end of said conventional paint roller is manually positioned while a water jet from a hose is manually directed against said paint roller element where by to rotate and clean water soluble paint therefrom which remains thereon after use.

3,587,600

CASES FOR TELESCOPIC UMBRELLAS

Fritz Bremshey, and Heinz Seitel, Solingen-ohligs, Germany, assignors to Telesco Brophey Limited, Montreal, Quebec, Canada

Filed Apr. 11, 1969, Ser. No. 815,334
Claims priority, application Germany, Apr. 13, 1968, Apr. 13, 1968, May 10, 1968,
P 17 57 242.8; P 17 57 243.9 and; P 17 57 454.8
Int. Cl. A45b *25/18*
U.S. Cl. 135—33 **12 Claims**



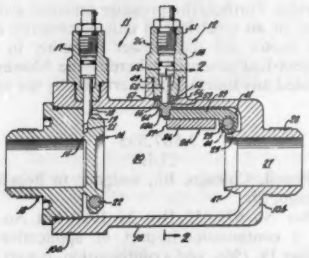
A sheath or case for a foldable-flat, telescopic umbrella to form a flat, rectangular package in which the sheath includes cooperating means on the umbrella handle and case comprising magnetically attractive elements, snap fasteners or a clip element; the sheath including a closure strap cooperating with a zipper, or the sheath including various strap or clip arrangements extending from one or both upper edges of the umbrella sheath and overlying the substantially rectangular handle, and/or the sheath including means whereby it can be stored and/or carried in a folded-over condition to occupy a minimum of space.

3,587,601

NORMALLY OPEN EXPLOSIVE-OPERATED VALVE, AND COMBINATION THEREOF WITH A NORMALLY CLOSED VALVE

William J. Shippy, Whittier, Calif., assignor to Pyronetics, Inc., Santa Fe Springs, Calif.

Filed Jan. 11, 1968, Ser. No. 697,123
Int. Cl. F16k *13/04*
U.S. Cl. 137—67 **21 Claims**



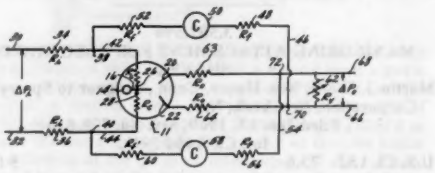
A normally open explosive-operated valve in which the movable valve element is pivotally connected to the housing, and is explosively actuated through about a 90° arc when shifted to closed position. The movable valve element and the associated valve seat are so constructed that slight misalignments do not prevent achievement of a very effective metal-to-metal seal after actuation. The invention further relates to the series combination of a normally open valve with a normally closed valve, in order that a start-stop fluid-flow operation may be achieved.

3,587,602

FLUERIC LAG-LEAD CIRCUIT

Thomas F. Urbanosky, Cincinnati, Ohio, assignor to General Electric Company

Filed Feb. 24, 1969, Ser. No. 801,291
Int. Cl. F15c *1/14*
U.S. Cl. 137—81.5 **7 Claims**



A push-pull flueric lag-lead circuit is disclosed which incorporates a fluid amplifier in its forward loop and a pair of positive feedback paths from the output of the fluid amplifier to the control port. The positive feedback path comprises a pair of flow resistances in series with each other and with a volume which provides a capacitance to ground.

3,587,603

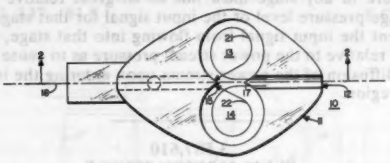
FLUIDIC SENSOR

Ronald G. Bailey, Saint Paul, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 14, 1966, Ser. No. 595,306
Int. Cl. F15c *1/08*; **G01k** *1/26*
U.S. Cl. 137—81.5 **1 Claim**

A fluidic temperature sensor which produces an oscillating signal having a frequency indicative of the temperature of the

fluid flowing therethrough and wherein the output flow is parallel to the input flow. The sensor comprises a chamber having a splitter therewithin, an inlet for directing fluid



against the splitter, and an outlet parallel to the inlet for allowing flow from the chamber. A signal pickoff may also be provided in the outlet.

3,587,604

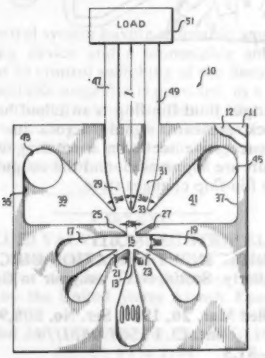
FLUIDIC AC AMPLIFIERS

Larry R. Moore, and Robert F. Turek, Silver Spring, Md., assignors to Bowles Fluidics Corporation, Silver Springs, Md.

Filed Aug. 20, 1968, Ser. No. 754,002

Int. Cl. F15c *1/04*

U.S. Cl. 137—81.5 **24 Claims**



A tuned fluidic amplifier circuit is disclosed wherein alternating flow signals in a frequency range about a predetermined frequency are amplified to a significantly greater degree than either direct flow signals or alternating flow signals outside said frequency range. A low impedance amplifier is employed utilizing control ports situated close to the power stream in order that the control fluid provides a transverse pressure gradient for selectively deflecting the power stream rather than employing momentum interchange between control and power fluid. The receivers and control ports are of large cross section relative to the power nozzle to minimize flow impedance and thereby optimize the circuit Q factor. The output passages of the amplifier may comprise resonant fluid passages in which standing waves are produced at the predetermined resonant frequency as established by the resonant passage length, or lumped-parameter tuned circuits may be connected to the output passages.

3,587,605

VORTEX FLUID MIXTURE CONTROL VALVE

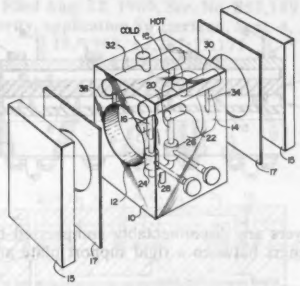
William L. Verplank, Menlo Park, Calif., assignor to Foster-Miller Associates, Waltham, Mass.

Filed Oct. 8, 1968, Ser. No. 765,805

Int. Cl. F15c *1/16*

U.S. Cl. 137—81.5 **7 Claims**

A flow regulator having a pair of vortex chambers each having a main tangential inlet and an axial outlet for its own liquid. Secondary tangential inlets for each chamber convey



the other liquid, which opposes the swirl of the main liquid in each to achieve controlled proportionality.

3,587,606

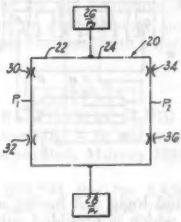
FLUIDIC ANALOG CONTROL APPARATUS

George R. Howland, South Bend, Ind., assignor to The Bendix Corporation

Filed Nov. 18, 1968, Ser. No. 776,832

Int. Cl. F15c *3/02*

U.S. Cl. 137—81.5 **15 Claims**



A bridge circuit having at least two parallel flow paths each of which paths are provided with a pair of series flow restrictions having a common flow area ratio. A floating or integrating piston connected to vary the effective flow area of one of the restrictions is responsive to the fluid pressure intermediate each pair of series restrictions which pressures are varied in accordance with variations in effective flow area of one or more of said restrictions in response to an associated input signal or signals applied thereto. Motion of the piston in response to a pressure differential between the intermediate pressures results in a corresponding change in flow area of the one restriction connected thereto to establish equalization of the intermediate pressures. A plurality of variable area parallel flow restrictions each of which is controlled by an associated input signal may be substituted for one of the restrictions. The position of the piston provides an output position which is a function of the sum, product or ratio of the various inputs controlling the restrictions. In addition, the piston may be connected to control the effective flow area of a restriction in a second bridge circuit similar to that described to extend the central functions of the fluidic system as desired. Pure fluid amplifying devices are suitably connected in the fluid circuitry to provide signal amplification thereby improving response of the piston.

3,587,607

FLUIDIC BLOCK ASSEMBLY

Gerhard Konig, and Manfred Pieloth, Dresden, Germany, assignors to VEB Reglerwerk Dresden, Dresden, Germany

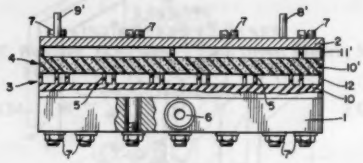
Filed Jan. 2, 1969, Ser. No. 788,557

Int. Cl. F15c *5/00*

U.S. Cl. 137—81.5 **3 Claims**

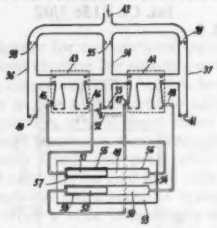
The fluidic elements are made of profiled strips projecting between superposed base and top mounting plates. The

material of the base mounting plate differs in hardness from that of the top mounting plate. A number of stacked fluidic



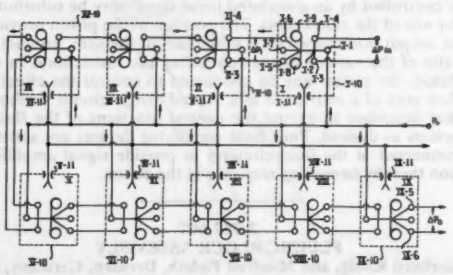
element layers are disconnectably compressed by means of screw fasteners between a rigid support plate and a closure plate.

3,587,608
DIFFERENTIAL FLUIDIC LOGIC CELL
Andre Fortier, 12 Rue Leon Cambillard, 92 Clamart, France
Filed Feb. 14, 1969, Ser. No. 799,208
Claims priority, application France, Jan. 15, 1968, 139,931
Int. Cl. F15c *1/20*
U.S. Cl. 137—81.5 **10 Claims**



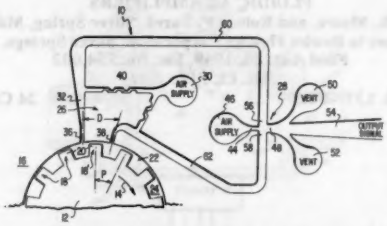
A differential fluid logic cell having an elongated enclosure, each end of which is provided with an identical axial nozzle and a lateral fluid exit. Fluid brought into the enclosure through the two nozzles under substantially equal pressures leaves the enclosure in such a way that the difference in fluid flow escaping through the fluid exits changes its sign in response to a change in sign of the difference in pressures prevailing in the ends of the enclosure.

3,587,609
SELF PRESSURIZING INTERACTION REGION
Carmine V. Di Camillo, Silver Spring, Md., assignor to Bowles Fluidics Corporation, Silver Spring, Md.
Filed Feb. 18, 1969, Ser. No. 800,164
Int. Cl. F15c *1/12*
U.S. Cl. 137—81.5 **8 Claims**



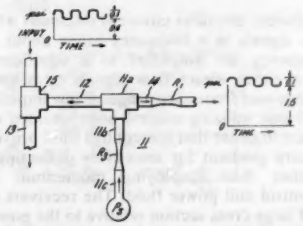
A fluidic amplifier circuit responds to a variable pressure input signal at a relatively low average pressure level to provide an amplified version of the pressure input signal at a substantially higher average pressure level. The circuit comprises a plurality of cascaded fluidic amplifier stages, the interaction regions of successive stages being maintained at respective successively increasing pressures by restricting vent flow from each stage as required. The interaction region pressure in any stage must not be so great relative to the average pressure level of the input signal for that stage as to prevent the input signal from flowing into that stage, nor so small relative to the power stream pressure as to cause excessive diffusion of the power stream upon entering the interaction region.

3,587,610
FLUID MOTION SENSOR
Lawrence W. Langley, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.
Filed Mar. 6, 1969, Ser. No. 804,892
Int. Cl. F15c *1/04, 3/00*
U.S. Cl. 137—81.5 **5 Claims**



A center-output fluid flip-flop is switched between its two states by back pressure signals across its control ports representing successive teeth on a rotating wheel. Normal flip-flop outputs are suppressed, and the output signal occurs only when the flip-flop changes state.

3,587,611
FLUIDIC INPUT ISOLATION CIRCUIT
Martin C. Doherty, Scotia, N.Y., assignor to General Electric Company
Filed Mar. 20, 1969, Ser. No. 808,952
Int. Cl. F15c *1/08, 1/14*
U.S. Cl. 137—81.5 **15 Claims**



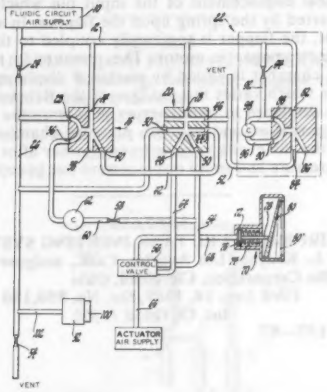
A fluidic circuit connected at the input to a fluidic system permits a pulsating fluid pressure signal containing harmful contaminants to be utilized in a fluidic system. The input circuit isolates the fluidic system from a contaminated or high temperature fluid signal source by providing a reverse fluid flow in an input fluid passage which, however, transmits the information bearing pulsating pressure signal to the fluidic system. The isolation circuit consists of a source of noncontaminated, pressurized fluid connected through a fluidic resistor to the input fluid passage. The source of noncontaminated fluid is at a sufficiently high pressure to assure the reverse flow under all operating conditions of the fluidic system. An optional fluidic decoupling circuit connected at the output of the isolation circuit converts the single-sided signal to a push-pull signal.

3,587,612

FLUIDIC CONTROL WITH A RESET CONTROL

John W. Creed, Jr., and Edgar C. Paffrath, Saginaw, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 5, 1969, Ser. No. 821,661
Int. Cl. F15c 1/12, 3/00
U.S. Cl. 137—81.5 6 Claims



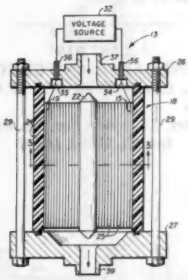
A fluidic control system having a bistable amplifier to control a switching device and a monostable amplifier and a pulse generator to control switching of the bistable amplifier. A second monostable amplifier is provided, as a zero reset, to insure the power input to the bistable amplifier is directed to the same output during each initial energization of the control system to condition the switching device for the preferred startup mode of operation.

3,587,613

ELECTRO-FLUID VALVE HAVING STRIP ELECTRODES

John W. Mark, Sunnyvale, and Howard H. Barney, Palo Alto, Calif., assignors to the United States of America as represented by the United States Atomic Energy Commission

Filed July 18, 1969, Ser. No. 843,110
Int. Cl. F15c 1/04
U.S. Cl. 137—81.5 6 Claims



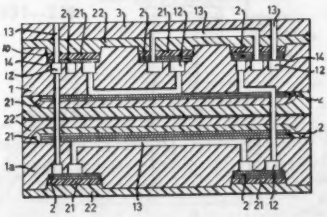
A valve comprised of string insulation wrapped at a wide path pitch around the width of a long thin flat strip of stainless steel and rolled with a second unwrapped strip of stainless steel to form a cylinder. An electrical gap is maintained by the spring between the strips of each layer of the cylinder. The string and the strips also form a multitude of narrow axial channels for passage of an electric-field-sensitive fluid from one end of the cylinder to the other under control of a voltage applied across the gap.

3,587,614

FLUIDIC COMPONENT WITH FLUID LOGIC ELEMENT

Aiun Burke, Zurich, Switzerland, assignor to Contraves A G, Zurich, Switzerland

Filed Aug. 22, 1969, Ser. No. 852,189
Claims priority, application Switzerland, Sept. 4, 1968, Nov. 15, 1968, 13,287/68, 17,171
Int. Cl. F15c 5/00
U.S. Cl. 137—81.5 4 Claims



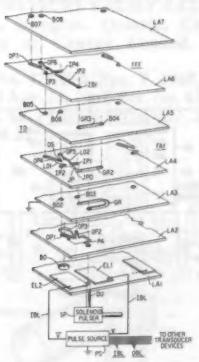
A novel construction of a fluidic component is disclosed, the fluidic component including at least one individual fluid logic element formed by main channel means as well as connection and communicating channel means associated therewith. In accordance with an important aspect of the instant invention, at least one closure wall of a channel is at least partially formed by the provision of a foil of porous material having one or more layers, such foil being embedded in and therefore imbued with a hardened adhesive.

3,587,615

ELECTRICALLY RESPONSIVE FLUID LOGIC DEVICE

David J. Thomson, Summit, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkely Heights, N.J.

Division of Ser. No. 659,794, Pat. No. 3,526,723 filed Oct. 30, 1969, Ser. No. 871,799
Int. Cl. F15c 1/04
U.S. Cl. 137—81.5 9 Claims

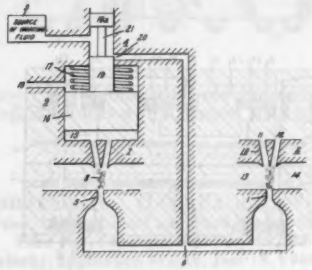


A transducer obtains fluid signals in response to electrical signals by electrostatically deflecting a jet of dielectric gas, introduced into a chamber, toward one of two outlet ports in the chamber, and then differentially amplifying the pneumatic signals appearing at the ports. Plates energized with the electrical signals and arranged on the chamber walls furnish the electrostatic potentials for deflection.

3,587,616
METHOD AND APPARATUS FOR REYNOLDS NUMBER COMPENSATION OF WORKING FLUID SUPPLIED TO FLUID AMPLIFIER

Willis A. Boothe, Scotia, N.Y., assignor to General Electric Company

Filed Nov. 10, 1969, Ser. No. 875,324
Int. Cl. F15c 3/02
U.S. Cl. 137—81.5 13 Claims

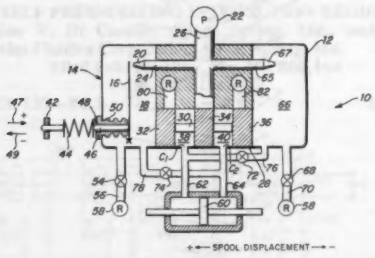


A variable area valve is interposed between a source of working fluid and the power nozzle of a hydraulic fluid amplifier, and its flow area is controlled in inverse response to pressure changes detected in a fluid jet issuing from a reference nozzle. The reference nozzle is substantially identical to, and is connected in fluid parallel with, the power nozzle of the fluid amplifier. Fluctuations in the Reynolds Number or viscosity associated with the working fluid are directly manifested in pressure changes in the jet issuing from the power nozzle and thus in gain changes in the fluid amplifier. Pressure changes detected in the reference jet are directly related to any pressure changes which occur in the power jet of the fluid amplifier and serve to compensate for the latter by moving the variable area valve so as to increase or decrease the pressure of the working fluid supplied to the fluid amplifier.

3,587,617
FLUID CONTROL APPARATUS

Zenny Olsen, Nashua, N.H., assignor to Allied Control Company, Incorporated, Plantsville, Conn.

Filed Dec. 16, 1968, Ser. No. 797,303
Int. Cl. F15b 5/00; G05d 16/00
U.S. Cl. 137—85 6 Claims

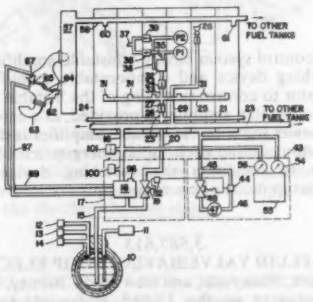


The present invention pertains to a pressure regulated hydraulic servo valve having a spool piston with three lands and communicating with a variable pressure chamber at one end of the spool and with a compensation chamber at the other end thereof. The inner land controls the application of system pressure to either one of a pair of control ports. The outer lands controls the application of system return to either of the control ports. One of the control ports is coupled through a fixed orifice to the compensation chamber and the other of the control ports is coupled through a fixed orifice to the variable pressure chamber. Both the compensation and variable chambers are coupled through a fixed orifice to system return. A torsionally mounted cantilever flapper variably occludes an output nozzle or variable orifice communicating with system pressure in dependence upon the input signal to the valve. The variable pressure chamber communicates with system pressure through the variable orifice. In one embodiment, the flapper is connected to a shaft which is in turn coupled to a spring and an input pin. The pressure in the variable pressure chamber is varied by mechanical displacement of the input pin which varies the force exerted by the spring upon the flapper. In another embodiment, the flapper is torsionally coupled to the armature of an electromagnetic motor. The pressure in the variable pressure chamber is varied by electrical displacement of the armature which varies the position of the flapper. The spool piston is displaced in a manner so as to vary the pressure in the compensation and variable pressure chambers so as to balance the same with respect to each other after the desired output pressure and spool displacement has been obtained.

3,587,618
AIRCRAFT FUEL TANK INERTING SYSTEM

Richard L. Kenyon, Los Angeles, Calif., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Aug. 14, 1969, Ser. No. 850,180
Int. Cl. G05d 11/00
U.S. Cl. 137—87 28 Claims

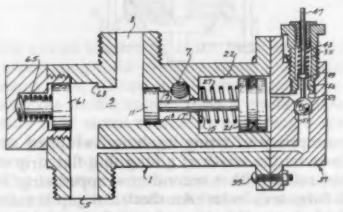


A fire and explosion prevention system for aircraft fuel tanks that utilizes an inert gas for pressurizing the fuel tanks and in which means is provided for preventing overpressurization of the fuel tanks in case of either clogging of vent passages that normally connect the fuel tanks to atmosphere or failure of vent valves to open.

3,587,619
COMPRESSOR UNLOADER AND CHECK VALVE UNIT

Joseph L. Krechel, Chesterfield, Mo. (P.O. Box 122, High Rise, Mo. 63049)

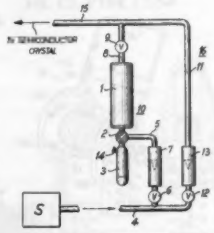
Filed Oct. 24, 1969, Ser. No. 869,234
Int. Cl. G05d 16/10
U.S. Cl. 137—116 3 Claims



A compressor unloader and check valve unit comprising a valve body having a pressure inlet port for connection thereto of a line from a compressor, a pressure outlet port for

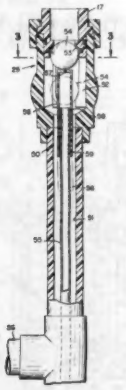
connection thereto of a line to an accumulator, and an exhaust vent port. A vent port valve member is provided in the body, this valve member being biased toward a closed position for blocking communication between the inlet port and the vent port, and being opened via a piston in the body under control of a pilot valve in response to increase of pressure in the outlet port. A check valve is provided in the body which is biased toward a closed position for blocking communication between the inlet and outlet ports.

3,587,620
VAPORIZING AND FLUID FLOW MEANS
Gottfried Berthold, Leonberg, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany
Filed Dec. 8, 1967, Ser. No. 689,050
Claims priority, application Germany, Dec. 16, 1966, 90366
Int. Cl. B67d *5/54*
U.S. Cl. 137—154 **8 Claims**



In doping a semiconductor the doping agent is confined in an enclosed vessel in vaporized state. A stream of gaseous carrier is intermittently passed through the vessel to enrich the carrier with a quantity of the vaporized doping agent. Thereupon, the thus enriched gaseous carrier is passed into contact with a semiconductor maintained at elevated temperature whereby the semiconductor is doped with the aforementioned quantity of vaporized doping agent.

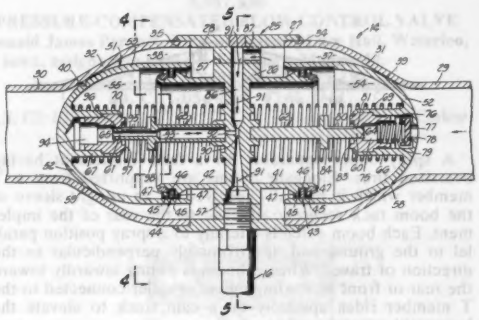
3,587,621
AUTOMATIC ADDITION OF LIQUID CHEMICALS IN LAUNDRIES
Robert A. Mohr, and Walter S. Medley, Sacramento, Calif., assignors to Community Linen Rental Service, Los Angeles, Calif.
Division of Ser. No. 722,846, Apr. 22, 1968, Pat. No. 3,495,743
Filed Sept. 18, 1969, Ser. No. 870,928
Int. Cl. B67d *5/54*
U.S. Cl. 137—209 **1 Claim**



The closure valve itself comprises a valve seat, a movable valve member normally urged by gravity down away from the seat, and a sleeve with a closed end inverted on a vertical conduit for air with lateral clearance and with its closed end resting on the upper end of the vertical conduit. Kinetic energy forces said sleeve up to move the valve member up, the length of said sleeve being greater than its upward movement up.

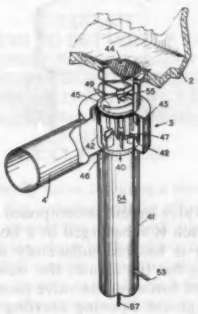
A plurality of systems are used with a plurality of washing machines with automatic program devices.

3,587,622
VALVE
Artson P. Hardison, Glendora, Calif., assignor to Schulz Tool and Manufacturing Co., San Gabriel, Calif.
Continuation of application Ser. No. 656,641, July 26, 1967, now abandoned. This application Nov. 10, 1969, Ser. No. 871,612
Int. Cl. F16k *31/34*
U.S. Cl. 137—220 **1 Claim**



A valve structure including a body and a conduit thereto, the body and conduit forming a valve chamber, and the conduit providing a valve seat with a piston-type valve in the valve chamber engageable with the valve seat and being supported by the body by means of an annular support on the body having a stationary external sealing means, the piston valve having a cylindrical skirt surrounding the annular support on the valve body and engageable with the sealing means to form a pressure chamber within the piston valve and annular supporting wall on the body in combination with means whereby pressure of the fluid in the conduit will open the valve, and fluid pressure within the pressure camber when admitted thereto will function to close the piston valve.

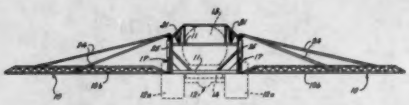
3,587,623
PRESSURE RELIEF VALVE
Ivan L. Wilson, Islington, Ontario, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Ontario, Canada
Division of Ser. No. 478,070, Aug. 9, 1965, Pat. No. 3,375,162 filed Apr. 21, 1967, Ser. No. 632,823
Int. Cl. F16k *19/00, 25/02, 23/00*
U.S. Cl. 137—246.22 **4 Claims**



A pressure relief valve is described consisting of a cylinder and a piston, and in which one end of the cylinder commu-

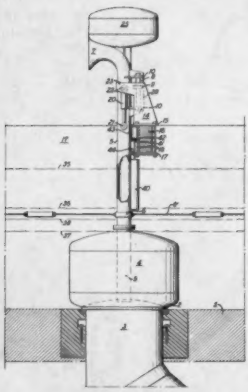
nicates with a duct from which pressure is to be relieved. There are ports in the side of the cylinder, and the piston is constructed as a bobbin with upper and lower plates. The valve operates by movement of the piston in the cylinder so as to uncover the ports and connect the duct to the ports. The other end of the cylinder has provision for establishing a pressure therein which affects the movement of the piston.

3,587,624
SPRAY BOOM APPARATUS
James T. Holloway, Whitewright, Tex.
Filed Sept. 29, 1969, Ser. No. 861,856
Int. Cl. B05b *9/02;* **E01h** *3/02*
U.S. Cl. 137—344 **6 Claims**



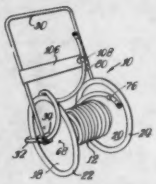
A spray boom apparatus for a farm implement having oversized tires. Elongate booms are supported from a T member which is pivotally received by an upright sleeve of the boom rack securely attached to the rear of the implement. Each boom extends laterally to a spray position parallel to the ground and approximately perpendicular to the direction of travel. When a boom is swung inwardly toward the rear or front of the implement, a roller connected to the T member rides upwardly on a cam track to elevate the boom with respect to the ground.

3,587,625
SAFETY VALVES
Philippe Alexandre, La Tronche, France, assignor to Societe Generale de Constructions Electriques et Mecaniques (Alsthom), Grenoble, France
Filed Nov. 29, 1968, Ser. No. 779,743
Claims priority, application France, Dec. 1, 1967, 5199
Int. Cl. E03b *7/07;* **F16k** *21/04*
U.S. Cl. 137—398 **8 Claims**



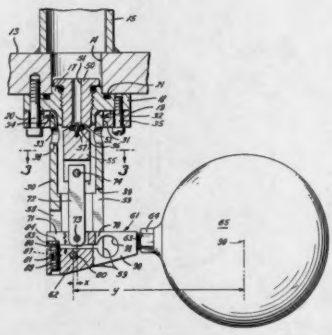
The improved valve herein is composed of a valve member having a float which is submerged in a body of liquid and in its open position is located adjacently above a horizontal discharge opening for the liquid; the buoyancy of the float exerting an upward force on the valve member and the liquid discharging through the opening exerting a downward force on the valve member. The valve member also comprises a tube which extends up through the body of the liquid and ballast for balancing the surplus upward force thereon to place the valve member under an equilibrium which will enable it to close at a given flow value. Associated with the valve member are means for compensating for variations in its buoyancy due to variations in the level of the body of liquid in which it is located. These compensating means comprise a counterweight immersed in the body of liquid with the float and connected to means for applying to the tube forces which are equal to but opposite in direction to the liquid forces applied to the tube at the different levels of the liquid through which it extends.

3,587,626
TRANSPORTABLE HOSE REEL
William E. Cowley, and Wilfred M. McCord, Jr., Louisville, Ky., assignors to Vermont American Corporation, Louisville, Ky.
Filed Sept. 3, 1969, Ser. No. 854,995
Int. Cl. B65h *75/34*
U.S. Cl. 137—355.12 **9 Claims**



A transportable hose reel constructed to store and transport a garden hose wrapped around a cylindrical drum having circular flanges secured to its opposite ends, which serve as wheels, and a hollow tubular axle disposed along the drum's cylindrical axis and extending beyond the two flanges a short distance. The ends of the axles are rotatably mounted in aligned openings provided in a hose reel frame structure at the connection of two U-shaped tubular frame members which are joined together in a 90° angle relationship at the outer extremities of their two arm portions. A short length of pipe is mounted on the frame adjacent to one end of the axle such that one of its ends projects axially into the tubular axle and carries two O-rings which provide a revolvable seal. A discharge conduit extends between the axle and the periphery of the drum to provide a connection to one end of the garden hose wrapped around the drum.

3,587,627
ADJUSTABLE TOGGLE FLOAT VALVE
Samuel E. Gilmore, Houston, Tex. (P. O. Box 265, Bellaire, Tex. 77401)
Filed July 11, 1969, Ser. No. 840,938
Int. Cl. F16k *31/18, 31/44*
U.S. Cl. 137—445 **10 Claims**



Valve closure is pivotally connected to one end of a link forming one bar of a toggle. Other bar of toggle comprises a

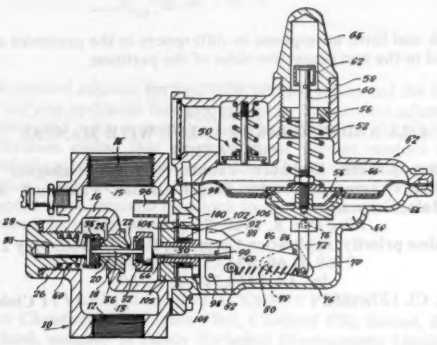
lever formed by a spring fork. One tine of fork is pivotally connected other end of link providing the knee of the toggle. Another tine of fork is pivotally connected to valve body at a point forming the fulcrum of the lever. The stem of the fork is connected to valve actuation means which may be a float. A setscrew through one end of one tine bears against end of other tine whereby tine spacing can be adjusted so that length of toggle bars just exceeds distance from fulcrum to valve closure when valve is in closed position, giving maximum closing thrust.

3,587,628

GAS PRESSURE REGULATORS

Sydney Farrer, Sheffield, and Ernest Edward Doe, Chesterfield, England, assignors to The Bryan Donkin Company Limited, Chesterfield, England

Filed Mar. 6, 1969, Ser. No. 804,749
Claims priority, application Great Britain, Mar. 11, 1968, June 4, 1968, 11818/68;26654/68
Int. Cl. F16k *17/64*
U.S. Cl. 137—456 **6 Claims**



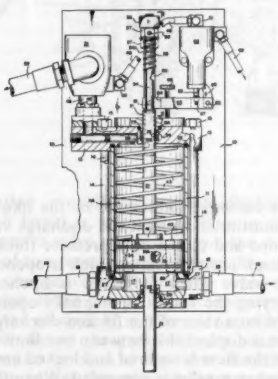
A gas pressure regulator having a regulator valve controlled by a flexible diaphragm acted upon by gas pressure in a gas chamber which communicates with an outlet chamber of the regulator, and having also a cutoff valve which is caused to close when the flow of gas from the outlet chamber to the gas chamber exceeds a predetermined rate on leakage of the flexible diaphragm.

3,587,629

VARIABLE RELIEF MEANS FOR A HYDRAULIC DRIVE

Kenneth G. Bright, Camas Valley, Oreg., assignor to Henkels and McCoy, Inc., Blue Bell, Pa.

Filed Oct. 22, 1969, Ser. No. 868,368
Int. Cl. F16k *17/18*
U.S. Cl. 137—484.2 **8 Claims**



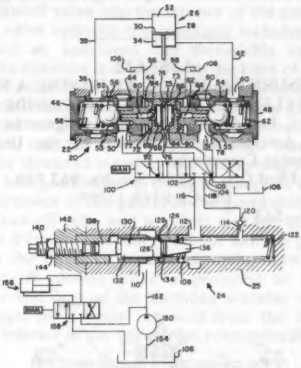
Variable relief means for a hydraulic drive are disclosed for incorporation into a hydraulic drive arrangement to cushion the drive from sudden pressure buildups as when the driven instrumentality encounters irregular resistance. A cylinder receives a transient flow constituting a portion of a hydraulic pumps output. A piston within the cylinder houses orifices through which fluid escape is metered. In communication with the cylinder interior is a relief valve. A remote pilot valve controls the relieving pressure of the relief valve. Linkage interconnects the remote pilot valve and the piston whereby upon piston movement resulting from a sudden pressure buildup, the pilot valve will gradually increase the pressure setting at which the relief valve will function. Accordingly pressure is gradually increased to the opening pressure value of a main relief valve in the drive system for complete system unloading.

3,587,630

PRESSURE-COMPENSATED FLOW CONTROL VALVE

Donald James Parquet, Dike, and Daniel Luce Hall, Waterloo, Iowa, assignors to Deere & Company, Moline, Ill.

Filed May 2, 1969, Ser. No. 821,184
Int. Cl. G05d *7/01;* **F16k** *1/44*
U.S. Cl. 137—504 **6 Claims**



A control valve assembly for controlling a two-way hydraulic cylinder including a pressure-compensated flow control valve for maintaining a constant predetermined flow rate to the hydraulic cylinder, a pair of check valves for preventing the return of fluid from the ends of the hydraulic cylinder, a pair of opposed hydraulically-operated pistons responsive to fluid pressure between their faces for respectively engaging and unseating the check valves and a manually-operated spool-type direction control valve for selectively connecting the outlets of the pressure-compensated valve to one or the other of the ends of the hydraulic cylinder and to the faces of the opposed pistons.

3,587,631

RELATING TO BUTTERFLY VALVES

Jesse Loader, Redditch, England, assignor to The Hymatic Engineering Company Limited, Redditch, England

Filed May 16, 1969, Ser. No. 825,167
Claims priority, application Great Britain, May 22, 1968, 24,432/68
Int. Cl. F16k *15/03*
U.S. Cl. 137—527 **4 Claims**

A nonreturn butterfly valve includes a movable valve plate, cooperating with a flat annular seating afforded by a ring, to which the plate is connected by a link pivoted to the ring about a first axis, lying close to the plane of the seating and extending across the seating approximately centrally, and pivoted to the plate about a second axis which lies parallel to the first axis, and, in the close position, lies between the first axis and a first edge of the plate, and a torsion spring surrounding the second pivot so that the valve can open by the link pivoting in one direction while the plate first swings in the same direction about a second edge remote from the first

edge, against the action of the spring, and thereafter swings in the opposite direction about the second axis, still against the action of the spring, causing the first edge to move towards or through the plane of the seating as the plate moves towards a position at right angles to the plane of the seating.

3,587,632

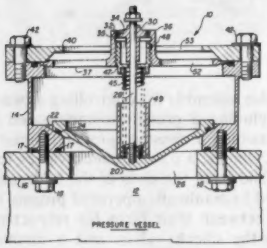
OVERPRESSURE RELIEF VALVE HAVING A FAIL-SAFE RELEASABLE VALVE STEM GUIDE

Haile S. Clay, Los Altos Hills, Calif., assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed Oct. 1, 1969, Ser. No. 863,759

Int. Cl. F16k *15/06*

U.S. Cl. 137—543 **6 Claims**



A spring-loaded valve head normally operable to be moved under differential pressure away from a seat. A stem extending from the head is guided in a sleeve that is mounted in the valve housing by means of an O-ring that is force fitted between the sleeve and housing in opposing grooves in the sleeve and housing. The guide, therefore, is releasable from the housing to permit valve head movement away from the seat in the event that the stem becomes bound in the sleeve during an overpressure.

3,587,633

PRESSURE RELIEF DEVICE

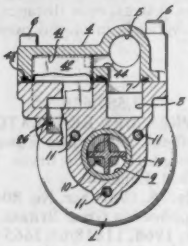
Einar T. Young, Newtown Square, Pa., assignor to Sun Oil Company, Philadelphia, Pa.

Filed Sept. 8, 1969, Ser. No. 855,849

Int. Cl. S16k *37/30;* **S16l** *55/04*

U.S. Cl. 137—551 **6 Claims**

An accumulator is provided in a liquid fuel dispensing apparatus, serving as a nonleak pressure relief device, to relieve pressure increases which may arise in the dispensing hose while the apparatus is idle. The accumulator comprises a flexible partition mounted within a chamber and moving back and forth in response to differences in the pressures applied to the two respective sides of the partition.



3,587,634

FILL AND DISCHARGE VALVE WITH MANUAL OPERATION

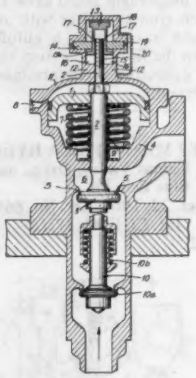
Walter Krause, Eschborn Taunus, Germany, assignor to Phonix Armaturenwerke Bregel GmbH, Frankfurt Am Main, Germany

Filed Dec. 8, 1969, Ser. No. 883,151

Claims priority, application Germany, Dec. 7, 1968, May 22, 1969, G 6810333.3;G 6920579.4

Int. Cl. F16k *31/44, 35/00*

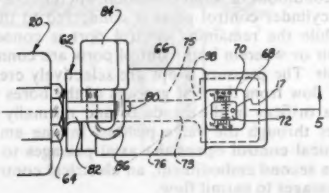
U.S. Cl. 137—553 **11 Claims**



A vessel for corrosive substances or the like has a valve construction constituted by a fill and discharge valve adapted for being opened and closed by a pressure fluid, and a normally closed back pressure valve which is opened by the fill and discharge valve when the latter is opened to permit filling or emptying the vessel. A manually operated spindle nut is threaded on a stem of the fill and discharge valve and the spindle nut is displaceable between two limit positions. In a first position the stem is secured and locked and opening of the fill and discharge valve is prevented. When the nut is out of the first position the fill and discharge valve can be operated by the pressure fluid, and when the nut is turned in the second position the stem is displaced and the fill and

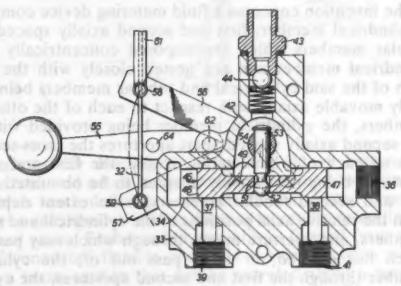
discharge valve is opened without the supply of the pressure fluid.

3,587,635
CONTROL ADJUSTER FOR HYDRAULIC APPARATUS
Robert E. Raymond, Zanesville, Ohio, assignor to International Basic Economy Corporation, New York, N.Y.
Filed Oct. 2, 1969, Ser. No. 863,235
Int. Cl. F16k 37/00
U.S. Cl. 137—556 6 Claims



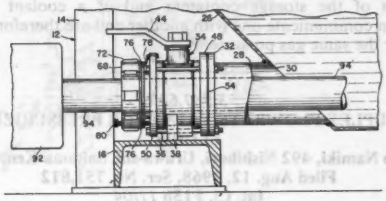
A control adjuster for hydraulic pumps, valves and the like for varying hydraulic flow and pressure. The control adjuster is provided with a modular attachment in the form of a calibration casing that provides linear vernier readout for precisely setting the control knob. The control adjuster is further characterized with a removable security casing adapted to be retained by a lock to prevent promiscuous adjustment by unauthorized personnel.

3,587,636
VARIABLE DISPLACEMENT PUMPS
John Christopher Eglington Flint, Chalford Hill, Stroud, England, assignor to Dowty Technical Developments Limited, Brockhampton, Cheltenham, England
Filed Mar. 20, 1969, Ser. No. 808,781
Claims priority, application Great Britain, Mar. 27, 1968, 14,626/68
Int. Cl. E03b 5/00, 11/16; F04b 1/30
U.S. Cl. 137—565 9 Claims



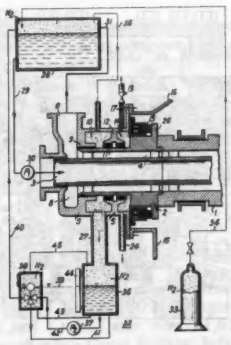
This invention provides a variable-displacement-pump through which liquid is intended to flow in one direction only, a changeover valve adapted to join the pump delivery to either one of two passages and a controlling member connected to the changeover valve and also connected to adjust the displacement of the pump. The arrangement is such that movement of the controlling member in one direction from a neutral position causes the pump delivery connection to be joined to one passage and in the other direction from the neutral position causes the pump delivery connection to be joined to the other passage, and movement of the controlling member in either direction from the neutral position causes the pump-displacement to be increased.

3,587,637
CONTAINER DISCHARGE SYSTEM
Clarence B. Coleman, 5530 Fernhoff Road, Oakland, Calif., assignor to Fabricated Metals, Inc.
Filed June 3, 1968, Ser. No. 733,975
Int. Cl. B67d 5/06
U.S. Cl. 137—577.5 10 Claims



A container discharge system adapted for removing high viscosity and semifluid materials from containers. A suction pump is disposed within or has a draw-off tube which extends through a shutoff valve into the interior of the container. The side of the valve opposite the container includes a threaded member and an apertured cap threadably engaging the member. The aperture is aligned with the bore of the valve, is of equal size, and the cap together with the end face of the threaded member defines a gland into which a gasket can be placed. To permit insertion of the draw-off tube, the bore of a flow-control member of the valve has a like diameter as the bore and the threaded member and the aperture in the cap, all of them being sufficient to permit passage of the draw-off tube. Compression of the gasket in the gland seals the exterior of the draw-off tube and prevents leakage or seepage of the material from the container past the annular gap between the bore in the threaded member and the draw-off tube to the exterior. A closure plate is provided to be inserted between the end face of the threaded member and the cap while no material is being removed from the container to protect the interior of the valve from contamination.

3,587,638
COOLANT COUPLING HEAD
Dietrich Lambrecht, and Erich Weghaupt, Mulheim(Ruhr), Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany
Filed Aug. 26, 1968, Ser. No. 755,238
Claims priority, application Germany, Aug. 24, 1967, P 16 13 266.4
Int. Cl. F16l 27/00
U.S. Cl. 137—580 3 Claims



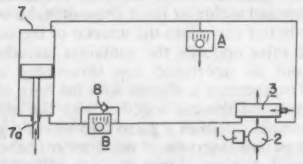
A coolant coupling head for the intake and discharge of a coolant in liquid-cooled electromachine rotors in which a protective gas chamber is provided between a coolant

discharge point and a seal against the external atmosphere. A gap seal is provided between such protective gas chamber and a coolant collection chamber at the coolant discharge point. By providing a coolant storage container, to which the coupling head is connected, at a geodetic height above the coupling head and the coolant collection chamber thereof, a constant amount of leakage between the coolant collection chamber and the protective gas chamber is maintained via the gap seal. Moreover, the protective gas chamber and gas rooms of the storage container and of a coolant return system communicate one with another and are therefore kept under the same gas pressure.

3,587,639
DUPLEX FLOWRATE VALVE FOR PRESSURIZED FLUIDS

Torao Namiki, 492 Nishihori, Urawa-shi, Saitama-Ken, Japan

Filed Aug. 12, 1968, Ser. No. 751,812
Int. Cl. F15b *11/04*
U.S. Cl. 137—595 **6 Claims**

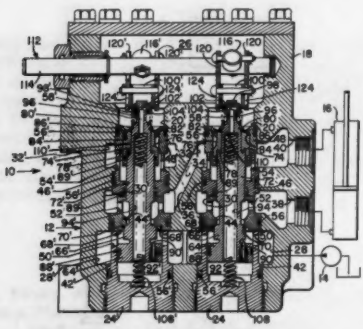


Two flowrate control valves for hydraulic systems having respective rotary throttle valves are joined back-to-back coaxially in tandem along the axis of the throttle valves, which comprise cutouts positioned in tandem on a common valve body at symmetrical positions with respect to the axis, one of the flowrate control valves being provided with a bypass check valve. The resulting combination is a duplex flowrate control valve operable by a single manipulation and which can be used to vary the speed of hydraulic fluid-driven devices without the adverse occurrences unavoidably accompanying control with a single control valve.

3,587,640
DIRECTIONAL CONTROL VALVE

Paul Edmund Hanser, Moline, Ill., assignor to Deere & Company, Moline, Ill.

Filed Nov. 13, 1969, Ser. No. 876,469
Int. Cl. F16k *11/04*
U.S. Cl. 137—596.14 **16 Claims**

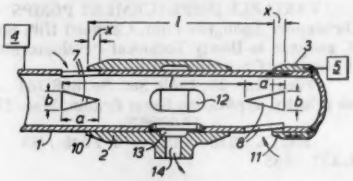


A directional control valve for a hydraulic function includes a pair of sleeve-lined bores that have consecutive first, second and third axially-spaced grooves between a closed end and an end which opens into a fluid reservoir. The first, second and third grooves of one bore are, on the one hand, respectively connected to a source of fluid pressure, one function control port and the other function control port and are, on the other hand, respectively connected to the first, third and second grooves of the other bore. Valve pistons are axially shiftable in the bores and have first and second valve surfaces normally biased against first and second valve seats in the bore to establish a neutral condition wherein fluid pressure is blocked in and from the function control ports. The valve pistons have heads, between the first grooves and closed ends of the bores, across which pressure drops are selectively independently or simultaneously created for shifting the valve pistons to respectively establish first and second active conditions or a flat condition wherein one or the other of the cylinder control ports is connected to the fluid pressure while the remaining control port is connected to the reservoir or wherein both control ports are connected to the reservoir. The pressure drops are selectively created by permitting flow from the first grooves of the bores to the reservoir via orifices in the heads of and normally closed axial passages through the valve pistons. In one embodiment, a mechanical control opens the axial passages to permit flow and in a second embodiment, an electrical control opens the axial passages to permit flow.

3,587,641
FLUID METERING DEVICE

Christopher Linley Johnson, Allestree, Derby, England, assignor to Rolls-Royce Limited, Derby, England

Filed May 19, 1969, Ser. No. 825,714
Claims priority, application Great Britain, May 27, 1968, 25262/68
Int. Cl. F16k *31/60*; F17d *1/00*
U.S. Cl. 137—608 **10 Claims**



The invention concerns a fluid metering device comprising a cylindrical member, first and second axially spaced apart tubular members which are disposed concentrically of the cylindrical member and are nested closely with the latter, each of the said cylindrical and tubular members being relatively movable axially with respect to each of the other said members, the cylindrical member being provided with first and second axially spaced apart apertures the cross-sectional area of each of which varies axially, the first and second apertures being respectively adapted to be obturated by the first and second tubular members to an extent dependent upon the relative axial positions of the cylindrical and tubular members, and aperture means through which may pass fluid which has entered, or is to pass out of, the cylindrical member through the first and second apertures, the cylindrical and tubular members being relatively movable axially so as to vary the effective flow area of selected apertures only, and so as to vary the effective flow area of both the first and the second apertures simultaneously.

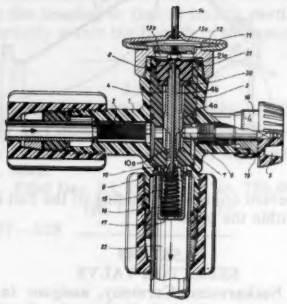
3,587,642
EXPANSION VALVE

Rudibert Gotzenberger, Fellbach, Germany, assignor to Firm Ernst Flitsch, Fellbach, Germany

Filed Feb. 14, 1969, Ser. No. 799,369
Claims priority, application Germany, Feb. 24, 1968, P 16 75 504.7
Int. Cl. G05d *16/06*
U.S. Cl. 137—614.21 **18 Claims**

An expansion valve has a main valve nozzle cooperating with a main valve body and an auxiliary valve nozzle

cooperating with an auxiliary valve body; the opening of the auxiliary valve nozzle is controlled by control means on the outside of the valve moving the auxiliary valve body between its closed and its open positions; a pair of membrane chambers are separated by a membrane operating the main valve body, one of the membrane chambers may be selectively connected with either an inlet of the valve or the outlet thereof.

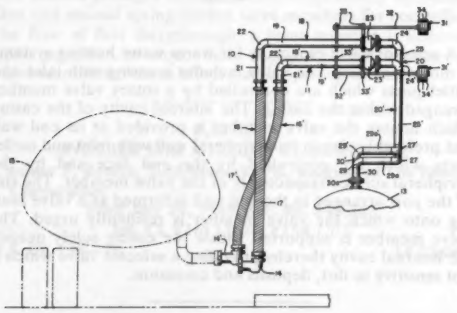


3,587,643

APPARATUS FOR TRANSFER OF LIQUIDS

William T. Bahr, Wallingford, and Joseph D. Bakstis, Naugatuck, Conn., assignors to Anaconda American Brass Company, Waterbury, Conn.

Filed Dec. 27, 1968, Ser. No. 787,511
Int. Cl. F17d *1/00*
U.S. Cl. 137—615 **6 Claims**



Apparatus for loading or unloading liquid between a storage tank and a bulk liquid carrier has at least two conduit assemblies, each defining a separate conduit path, mounted in side-by-side spaced relationship and normally extending in a vertical plane. Each conduit assembly is formed from a series of connected flexible and rigid tubular sections which define a boom section that can be swiveled about a vertical axis and can be pivoted about a horizontal axis. The assemblies are balanced to maintain a flexible hose having an end fitting for attachment to the bulk carrier suspended normally vertically but can be moved up or down by application of a small force and can be swiveled relative to each other so as to cross over one another.

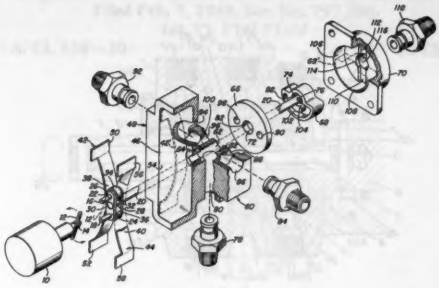
3,587,644

FOUR-WAY VALVE AND ACTUATOR

George M. Whitehouse, Wallingford, Conn., assignor to Laboratory For Electronics, Inc., Boston, Mass.

Filed Aug. 12, 1968, Ser. No. 751,920
Int. Cl. F16k *31/48*
U.S. Cl. 137—624.13 **4 Claims**

Apparatus is disclosed for providing a variable output motion in response to a uniform input motion including a rotatable drive member for driving auxiliary drive means at a first speed during a first portion of a revolution of the drive member to load and then release energy storage means which upon its release drives the auxiliary drive means at an initially higher second speed during a second portion of a revolution.

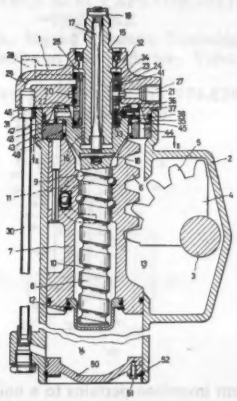


3,587,645

VALVE FOR SERVO-STEERING DEVICES

Enrique Carbo Mengual, Santiago Rusinal 10, Barcelona, Spain

Filed Sept. 19, 1969, Ser. No. 859,370
Int. Cl. F16k *11/02*
U.S. Cl. 137—625.21 **3 Claims**



A hydraulic valve for a servo steering device where the hydraulic fluid flows through a continuous longitudinal slot in the steering shaft. The relative position of an enveloping sleeve will control the appropriate flow of hydraulic fluid to effectuate the rotary movement. A spindle connected to the steering shaft includes internal teeth that engage in the same cavity formed by the continuous slots located in the steering shaft. This particular hydraulic conduit system eliminates the costly machining associated with other hydraulic systems.

3,587,646

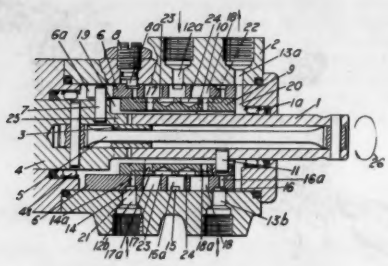
FLUID CONTROL VALVE WITH RADIALLY DRILLED PARTS

Frederick John Adams, Campton, near Shefford, England, assignor to Cam Gears Limited, Hitchin, England

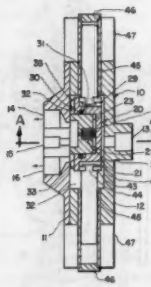
Filed July 1, 1968, Ser. No. 741,630
Claims priority, application Great Britain, July 6, 1967, June 14, 1968, 31110/67; 28438/68
Int. Cl. F16k *11/00*
U.S. Cl. 137—625.17 **10 Claims**

The invention described concerns the construction of (and a method of constructing) fluid control valves of either ro-

tary or spool type in which ports are of circular formation and are formed by drilling into the cylindrical interface of the inner valve member, and further involves the practical application of such valves in hydraulic power steering.



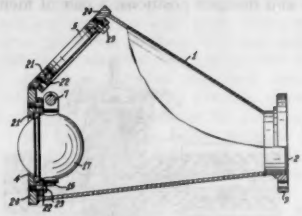
3,587,647
FOUR WAY VALVE
John D. Walters, Route 6, Box 244H, New Orleans, La.
Filed Sept. 23, 1969, Ser. No. 870,601
Int. Cl. F16k *11/02, 5/14*
U.S. Cl. 137—625.25 **4 Claims**



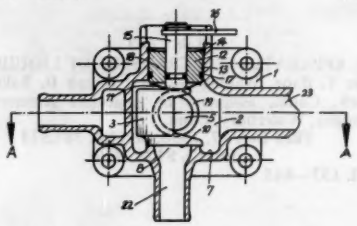
The present invention pertains to a unique four way valve which is inexpensive and ideally suited for use as a solenoid actuated valve due to its ease of operation. The valve basically comprises a porting block contained within a reciprocating transfer block mounted on ball bearings. The transfer block in turn is connected to actuating means which can be a valve handle, solenoid magnet, or the like. Three ports are positioned on one side of the valve, two of which when covered by the porting block are thereby in open communication with each other, and the other port being in open communication with the one port located on the opposite side of the valve body. This relationship is reversed upon shifting the porting block.

3,587,648
VALVE
Ralph L. Capriola, Darien, Conn., assignor to Pullman Incorporated, Chicago, Ill.
Continuation-in-part of application Ser. No. 677,619, Oct. 24, 1967. This application Oct. 7, 1968, Ser. No. 777,946
Int. Cl. F16k *11/02*
U.S. Cl. 137—625.44 **10 Claims**

A ball valve having the ball mounted for rotation about, and displacement along its carrying shaft and adapted to be seated in an outlet port having a seat so disposed angularly to the path of the ball that contact of the ball with the seat rotates the ball about the shaft and displaces the ball along the shaft to prevent continuous seating of the ball in identical orientations within the port.

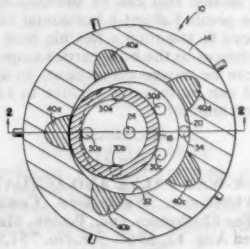


3,587,649
SELECTOR VALVE
Rolf Lechler, Neckarsulm, Germany, assignor to NSU Motorenwerke Aktiengesellschaft, Neckarsulm, Germany
Filed Apr. 30, 1969, Ser. No. 820,415
Claims priority, application Germany, May 4, 1968, P 17 50 469.7
Int. Cl. F16k *11/08*
U.S. Cl. 137—625.47 **4 Claims**



A selector valve especially for warm water heating systems in motor vehicles. The valve includes a casing with inlet and outlet ports which are controlled by a rotary valve member arranged within the casing. The internal cavity of the casing which houses the valve member is provided at its end wall and preferably also in its peripheral wall with inlet and outlet ports which are controlled by the end face and by the peripheral surface respectively of the valve member. The rim of the port arranged in the end wall is formed as a valve seating onto which the valve member is resiliently urged. The valve member is supported within the casing solely outside the internal cavity thereby providing a selector valve which is not sensitive to dirt, deposits and corrosion.

3,587,650
VALVING
James M. Denker, Scituate, Mass., assignor to Nutron Corporation, Hingham, Mass.
Filed June 19, 1969, Ser. No. 834,737
Int. Cl. F16k *11/00*
U.S. Cl. 137—625.65 **14 Claims**



A magnetic valve comprising a housing defining a valving surface and an inlet passage terminating at the surface in an

inlet port, a valving member at least in part of magnetic material having a cavity extending inwardly from an opening in a surface thereof mounted on the housing with the surface thereof engaging the valving surface, an electromagnet for moving the valving member relative to the housing, and means for constraining movement of the valving member relative to the housing so that at least a portion of the inlet port is invariably within the bounds of the opening.

3,587,651

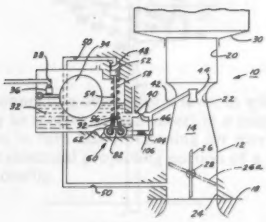
MULTISTAGE POWER VALVE ASSEMBLY

William E. McCollough, Detroit, and Ronald E. Herman, Warren, Mich., assignors to Holley Carburetor Company, Warren, Mich.

Filed Dec. 23, 1968, Ser. No. 786,033

Int. Cl. F16k *11/14*

U.S. Cl. 137—628 **4 Claims**



A power valve assembly has a housing portion with first and second passages formed therein respectively containing first and second spring-loaded valve members for controlling the flow of fuel therethrough; a lever member is effective upon actuation to sequentially engage the first and second valve members so as to affect staged opening thereof.

3,587,652

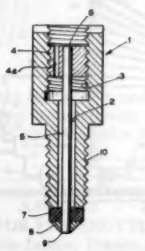
SNUBBER FOR A FLUID PRESSURE LINE

Casimer F. Remus, Tunkhannock, Pa., assignor to The Bendix Corporation

Filed July 24, 1969, Ser. No. 844,503

Int. Cl. F16l *55/04*; F15d *1/02*

U.S. Cl. 138—26 **14 Claims**



A snubber for avoiding oscillation and transients with sudden changes in pressure in a fluid pressure line having a restriction in the flow path to damp sudden changes in fluid pressure, and temperature responsive means for changing the restriction in the flow path with changes in temperature to compensate for changes in viscosity of the fluid.

3,587,653

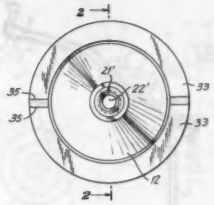
SPHERICAL ACCUMULATOR

Alphonse A. Jacobellis, and Abduz Zahid, Los Angeles, Calif., assignors to Greer Hydraulics, Inc., Los Angeles, Calif.

Filed Feb. 7, 1969, Ser. No. 797,390

Int. Cl. F16l *55/04*

U.S. Cl. 138—30 **10 Claims**



This invention relates to a pressure vessel having two juxtaposed hemispherical shells, each with a peripheral flange between which the periphery of a deformable separator in the form of a bladder is secured to define a chamber on each side thereof in communication respectively with an axial port in the associated shell, the bladder having a hemispherical configuration complementary to that of one of said shells and carrying a metal button axially aligned with the shells and adapted alternately to seat on said ports to close the latter without stretching of the bladder.

3,587,654

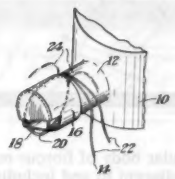
QUICK-REMOVABLE SEAL CAPS FOR FITTINGS AND THE LIKE

William C. Yocum, Mount Lebanon Township, Allegheny County, Pa., assignor to Superior Valve Company, Washington, Pa.

Filed Nov. 12, 1968, Ser. No. 774,829

Int. Cl. B65d *59/06*

U.S. Cl. 138—96 **8 Claims**



The application discloses quick removal of caps which are conventionally used on various types of fittings or plumbing components to seal them and prevent entry of foreign matter. A string, wire, cord, or other flexible member is placed between the seal cap and the fitting to facilitate removal and/or cutting of the seal cap. When the cord is pulled to cut or remove the seal cap the tightly fitting cap at least aids in preventing the cord from being pulled from its position between the cap and fitting.

3,587,655

SUPPLY LINE FOR THERMOPLASTIC CEMENT IN LASTING MACHINES

Herbert Schindler, Pirmasens, Germany, assignor to Firma Schon & Cie, Gesellschaft Mit Beschrankter Haftung, Primasens, Germany

Filed Jan. 17, 1969, Ser. No. 792,117

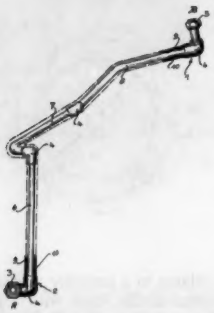
Claims priority, application Germany, Jan. 18, 1968, Sch 44077

Int. Cl. F16l *11/00, 27/00, 19/00*

U.S. Cl. 138—120 **9 Claims**

In a deformable and pivotable supply line for supplying thermoplastic cement to be applied to an insole when bond-

ing the edge of a covering leather thereto, one end of the supply line communicating with a cement heating container, the other end accommodating a cement applicator adjacent to the last in a lasting machine, which latter end is movable for that purpose, a heating element along said supply line for maintaining the liquid cement conveyed therethrough at an elevated temperature, said supply line being made up from at



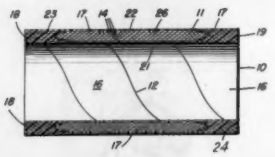
least two lengths of connected metal tubing in threading association the lengths of metal tubing including outer thread sets, the connections therefor including inner and/or outer thread sets, the improvement comprising providing the inner and outer thread sets with an extra large degree of free play, the resulting clearances being filled by a sealing band of heat-resistant synthetic resin, said band being applied to the outer thread set of the tubing lengths or connections therefor.

3,587,656

AN IMPREGNATED TUBULAR ARTICLE

McCleery B. Cunningham; Auburn Woods, Jr, and Charles K. Dunlap, Jr, Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed May 20, 1968, Ser. No. 730,419
Int. Cl. F16l 9/14
U.S. Cl. 138—144 **3 Claims**



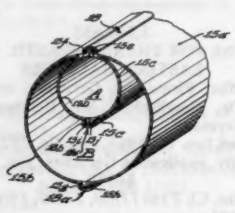
A multi-ply tubular body of fibrous material wherein continuous portions adjacent to and including the inner surface, the outer surface and the end surfaces are impregnated with a synthetic resinous material which completely encompass an internal unimpregnated sidewall portion extending throughout the major portion of the length and thickness of the tubular body sidewall.

3,587,657

ZIPPER TUBING

Karel J. Staller, Rutherford, N.J., assignor to Flexigrip, Inc.

Filed June 19, 1968, Ser. No. 738,209
Int. Cl. F16l 11/12
U.S. Cl. 138—156 **8 Claims**



A continuous thin plastic film tube for containing wires or the like, open along one side with continuous elongate hook at each of the edges of the opening and an elongate closure strip with resilient jaws for engaging the hooks.

3,587,658

SELF-ERECTING SPIRAL TUBE DEVICE

Charles M. Giltner, North Wales, Pa., assignor to Ametek, Inc., New York, N.Y.

Continuation-in-part of application Ser. No. 499,580, Oct. 21, 1965, now Patent No. 3,467,329. This application Oct. 24, 1968, Ser. No. 770,361
Int. Cl. F16l 9/16
U.S. Cl. 138—154 **4 Claims**

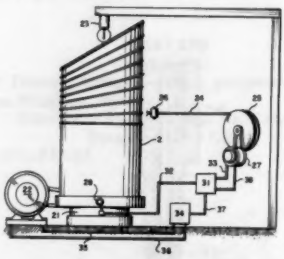
A tube comprises a helical axially extending ribbon of spring material which has adjacent turns set to coil tightly in overlapping and telescoping engagement.

3,587,659

WRAPPED TUBULAR CONCRETE PIPE

Thomas K. Breitfuss, Tustin; Floyd L. Wallace, La Habra, and Joseph P. Zicaro, Tustin, all of Calif., assignors to Hydro Conduit Corporation, Orange, Calif.

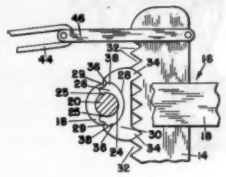
Filed Jan. 8, 1968, Ser. No. 696,402
Int. Cl. F16l 9/00
U.S. Cl. 138—172 **14 Claims**



Reinforced concrete and method of making same inclusive of hollow concrete body of tubular shape having beveled end and reinforcing member wrapped on exterior surface of length of concrete body at beveled end in progression of wraps to form continuous helical assembly. Reinforcing assembly under lesser tension along shorter side portion than

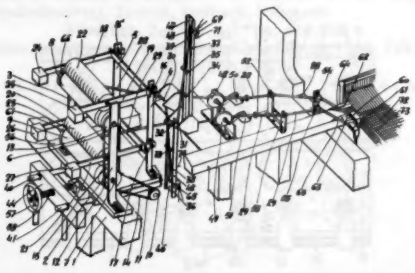
longer side portion to provide more nearly equal stress in concrete body. Means associated with concrete body onto which reinforcing member is wrapped for holding reinforcing member against circumferential movement to maintain said preselected tension in reinforcing member.

3,587,660
WEAR INSERTS IN DOBBY JACK
Raymond F. Dion, Worcester, Mass., assignor to Crompton & Knowles Corporation, Worcester, Mass.
Filed May 2, 1969, Ser. No. 821,428
Int. Cl. D03c *13/00*
U.S. Cl. 139—84 **12 Claims**



A snap-on connecting device for a lever in which the lever has an opening to receive a wear insert in a snap-in relationship. The insert in turn has an opening for receiving a trunnion or other cylindrical projecting portion of a connector in a snap-in relationship.

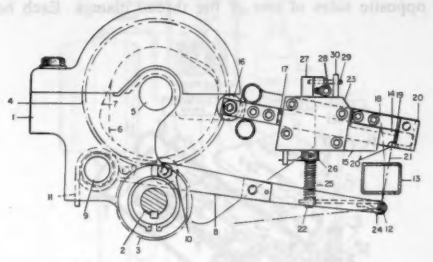
3,587,661
METHOD FOR PRODUCING WOVEN FABRICS WITH STATIONARY WEFT TAPES
Ramon Balaguer Golobart, Calle Valls y Taberner 11, Barcelona, Spain
Filed July 18, 1968, Ser. No. 745,846
Claims priority, application Spain, July 22, 1967, 343,796
Int. Cl. D03d *47/34*
U.S. Cl. 139—122 **5 Claims**



Apparatus for inserting flat weft strands in weaving looms wherein a movable strand storage guide collects the correct length of weft strand for each insertion from a continuously moving supply.

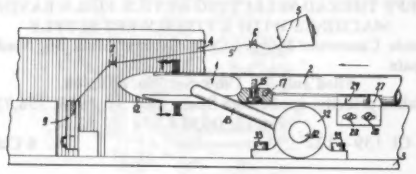
3,587,662
WEFT DISTRIBUTOR FOR SHUTTLELESS LOOM
Pierre Remond, Bourgoin-Jallieu, France, assignor to Ateliers Diederichs, Bourgoin-Jallieu, Isere, France
Filed Dec. 31, 1968, Ser. No. 788,141
Claims priority, application France, Jan. 18, 1968, 49539
Int. Cl. D03d *47/12, 47/34*
U.S. Cl. 139—122 **4 Claims**

A weft distributor for a shuttleless loom comprises a clasp associated with a thread cutter, in combination, on one hand, with a weft feed actuated for a rising and falling movement and, on the other hand, with a pivoting tip for holding the weft. The clasp includes a blade moving longitudinally in a slide so that a flat end of the blade can grip the weft yarn against a small elastic plate. One edge of the blade constitutes a shears cooperating with a fixed back blade constituting the thread cutter. The movement of the pivoting tip is controlled by an axially movable shaft bearing a coaxial return spring and stops. These elements are coordinated by



cam and lever actuators so that when the clasp is open and hence no longer holding the free end of the weft, the feed rises to place the weft in the path of the needle. The weft held in the tip is only released when the tip has pivoted under the action of the tension due to the displacement of the picking needle.

3,587,663
THREAD-PASSING DEVICES OF SHUTTLELESS LOOMS
Yves Juillard, and Bernard Geiger, Mulhouse, Haut-Rhin, France, assignors to Societe Alsacienne De Constructions Mecaniques De Mulhouse, Mulhouse, France
Filed Feb. 25, 1969, Ser. No. 802,119
Claims priority, application France, Feb. 27, 1968, 141,353
Int. Cl. D03d *47/14*
U.S. Cl. 139—122 **4 Claims**

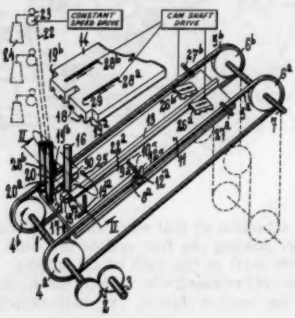


A weft-thread-passing device for a shuttleless loom in which a clamp for catching the weft thread has two jaws adapted to catch the thread by a clamping action only. The clamp jaws are mounted so that they can move apart temporarily from one another when the clamp is in the rest position at the end of a return pass of weft-thread-delivery means, with the movement apart of the jaws being controlled and a blower device being provided to blow a stream of air onto the clamp when the weft-thread-delivery means is in its rest position.

3,587,664
DEVICE FOR PREPARING A WEFT
Hubert Peter Van Mullekom, Deurne, Netherlands, assignor to N. V. Machinefabriek L. Te Strake, Deurne, Netherlands
Filed May 27, 1969, Ser. No. 828,290
Claims priority, application Netherlands, May 28, 1968, 6807543
Int. Cl. D03d *47/34*
U.S. Cl. 139—122 **1 Claim**

The device includes a thread guide for conducting a weft thread, which has a thread outlet through which the thread emerges from the thread guide, and which is movable to carry the thread outlet through a substantially elliptical path. Two thread clamps for intermittently clamping the thread are provided at two points which are centrally located on the two

long sides of such elliptical path. A pair of shoulders are located immediately inside the two short sides of the elliptical path, around which the thread is wound as the thread outlet moves through the elliptical path. Two hook members are cyclically movable, substantially 180° out of phase with one another, in two parallel paths that intersect the elliptical path, on opposite sides of one of the thread clamps. Each hook



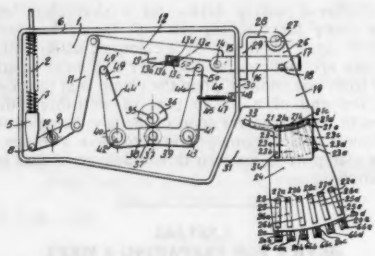
member engages the thread so as to draw a loop of the thread out of the elliptical path. A cutter is provided for severing the thread at a point in the elliptical path where the thread enters the other thread clamp, and a pair of pushing needles are intermittently longitudinally movable in two parallel paths that intersect the elliptical path on opposite sides of the other thread clamp, for engaging the thread to deliver it to a weft inserting device.

3,587,665

WEFT THREAD SELECTING DEVICE FOR WEAVING MACHINES WITH A FIXED WEFT SUPPLY

Antonio Camarasa Monge, Calle General Mola 36, Madrid, Spain

Filed July 28, 1969, Ser. No. 845,340
Claims priority, application Spain, July 31, 1968, 356,720
Int. Cl. D03d *47/34*
U.S. Cl. 139—122 **6 Claims**



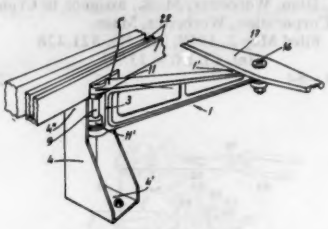
A series of weft thread presenting elements are arranged in a pendular supply means for rectilinear movement on respective downwards divergent paths. the said supply means being hinged to an angular support connected to a housing adapted to be mounted on a weaving machine with a fixed weft supply adjacent one side of the ways and containing mechanical means, governed by a single control means, for tilting the pendular supply means to a position in which one of the presenting elements is in a vertical position and for operating this selected element.

3,587,666

SHUTTLELESS LOOMS

Jose Bassa Basart, Calle Bailen 150, Barcelona, Spain

Filed May 27, 1969, Ser. No. 828,146
Claims priority, application Spain, May 30, 1970, 354,921
Int. Cl. D03d *47/00*
U.S. Cl. 139—123 **3 Claims**



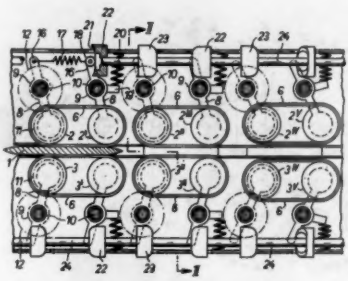
A stabilizing arm is mounted on a vertical axis for reciprocatory pivotal movement to support and guide the movement of the rocking arm of an actuating linkage assembly for the weft inserter of a shuttleless loom.

3,587,667

DRIVING AND BRAKING MECHANISM

Allan William Henry Porter, Lustmuhle, Switzerland, assignor to Aktiengesellschaft Adolph Saurer, Arbon, Switzerland

Filed Apr. 24, 1969, Ser. No. 819,049
Claims priority, application Switzerland, May 2, 1968, 6508/68
Int. Cl. D03d *49/24, 49/54*
U.S. Cl. 139—142 **9 Claims**

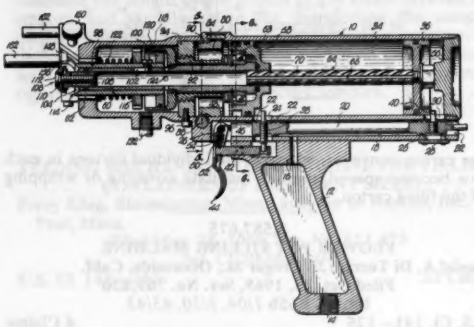


A weaving shuttle propulsion and checking mechanism situated outside the warp shed on both sides of the weave width facing each other on the weaving machine consisting of continuously rotating positively driven rollers and bands which are arranged in pairs parallel to one another on separate axis over one another and behind one another carried on levers which are positively steered to bring the pairs of rotating members with pressure into or out of contact with the shuttle so as to grip and transmit their movements in the operative position to the shuttle according to the direction of movement of the shuttle towards or away from the woven fabric edge at the most desired velocity of the shuttle relative to the weaving cycle.

ERRATUM

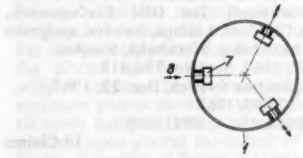
For Class 140—001 see:
Patent No. 3,587,673

3,587,668
POWERED WIRE-TYING TOOL
James E. Ward, 984 Seco St., Glendora, Calif.
Filed Sept. 9, 1968, Ser. No. 758,263
Int. Cl. B21f 9/02, 7/00, 15/04
U.S. Cl. 140—93.6 20 Claims



A handtool for wire tying of reinforcing bars or the like is shaped for pistol grip handling and valve triggering, and is provided with a wire feeder, structure for guiding the wire into a loop around the bars, a wire cutter and a twister, all operable during each cycle of a reciprocable, pneumatic piston. The stem of the piston rotates a chuck having jaws which grip the ends of the loop during twisting. One of the jaws not only actuates the feeder but has a wire cutter thereon operable through a secondary pneumatic drive. A lost-motion assembly permits selection of loop size in accordance with the dimension of the object being tied.

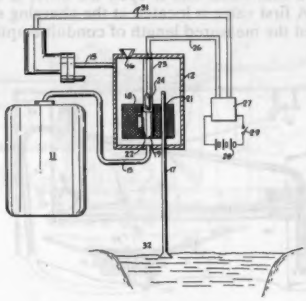
3,587,669
PROCESS FOR PROVIDING REACTORS WITH CATALYSTS AND VIBRATOR FOR USE IN CARRYING OUT THE PROCESS
Bent Bors Vabo, Birkerod, and Per Heymann Andersen, Virum, Denmark, assignors to Haldor F. A. Topsoe, Frydenlundsvej, Trorod, Vedbaek, Denmark
Filed Feb. 2, 1967, Ser. No. 613,506
Claims priority, application Denmark, Feb. 5, 1966, 598/66
Int. Cl. B65b 1/22
U.S. Cl. 141—12 4 Claims



Method and apparatus for packing catalyst beds utilizing symmetrically spaced vibration generators mounted on an annular vibration-transmitting element which is raised as the catalyst level rises.

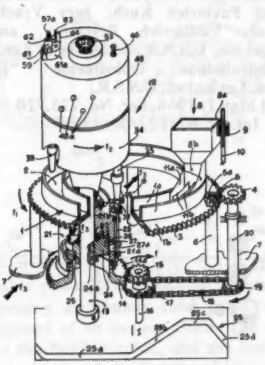
3,587,670
SAMPLER AND PUMPING SYSTEM
Harrison D. Brailsford, 670 Milton Road, Rye, N.Y.
Filed Dec. 8, 1967, Ser. No. 689,130
Int. Cl. G01n 1/14
U.S. Cl. 141—35 5 Claims

A system to transfer fluid from a source to one or more containers without the fluid coming into contact with any of the movable members pumping it such as valves, pistons and the like. It includes a closed hollow chamber, a vacuum pump to evacuate the chamber, a float actuated switch in the chamber to turn the pump on and off depending on the level of the fluid in the chamber and one or more containers to receive and store the fluid. A connecting tube extends from



the bottom of the chamber to the containers and another tube extends from the chamber to the fluid source.

3,587,671
MACHINE FOR DISPENSING PREDETERMINED AMOUNTS OF POWDERED OR GRANULAR PRODUCE IN CONTAINERS BY MEANS OF VOLUMETRIC DISPENSERS
Ernesto Gamberini, Via Abruzzo 6/5, Bologna, Italy
Filed Apr. 25, 1968, Ser. No. 724,034
Claims priority, application Italy, Apr. 28, 1967, 1636A/67
Int. Cl. B65b 1/16
U.S. Cl. 141—67 3 Claims

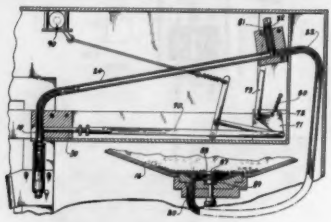


A machine with volumetric dispensers for dispensing predetermined amounts of powdered or granular product into containers by means of said volumetric dispensers, comprising means defining an annular and upwardly open reception space rotating about a vertical axis, a hopper for feeding the product into said reception space, a support for the volumetric dispensers a vertical shaft surrounded by said reception space and allowing rotation of said support thereabout and causing the dispensers to move along a circular path at least partly overlapping said reception space the dispensers having substantially the same peripheral velocity as the rotating reception space, conveyor means for the containers including a sleeve member rotatable connected with said support and having a platform member with a plurality of peripheral seats for said containers and arranged in alignment with said dispensers.

3,587,672
AUTOMATIC TUBE LOADER
William G. Meinch, 19 E. Loines Ave., Merrick, N.Y.
Filed July 15, 1969, Ser. No. 841,838
Int. Cl. B65b 1/08, 3/10
U.S. Cl. 141—67 7 Claims

A machine for loading a tube with a predetermined charge of BB's or the like, incorporating a pressure source, a pres-

surized storage tank, and pressurized conduit leading from the tank to a loading position. Two valves are located on the conduit a measured distance apart and work jointly but oppositely such that when one is open the other is closed and vice versa. A first valve is located at the charging station and when opened the measured length of conduit empties its contents into a tube, while the second valve is closed, preventing additional BB's from entering the measured length of conduit. After a timed interval the first valve is closed and the second valve is opened to introduce a new quantity of BB's into the measured conduit. Rotation of the tube actuates the valve.

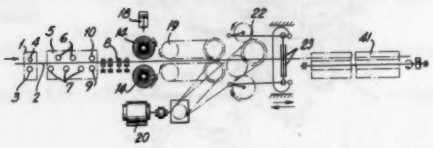


3,587,673

INSTALLATION FOR CUTTING ELECTRIC WIRES AND SKINNING ELECTRIC WIRE ENDS

Vladimir Ivanovich Smirnov; Edvard Grigorievich Danilov; Grigory Evseevich Ariev; Maria Fedorovna Kovalenko; Konstantin Andreevich Shtyryaev; Konstantin Dmitrievich Smirnov; Pavel Pavlovich Kush; Jury Vyacheslavovich Petrov; Anatoly Vasilievich Belozerov, and Viktor Vasilievich Burekhin, U.S.S.R., assignors to Leningradskoe Electromashinostroitelnoe Obiedinenie "Electrosila" IM.S.M. Kirova, Leningrad, U.S.S.R.

Filed May 1, 1968, Ser. No. 725,710
Int. Cl. B21f *21/00, 11/00*
U.S. Cl. 140—1 **10 Claims**



Apparatus is provided for skinning and cutting an insulated wire as the wire is continuously fed. The apparatus includes a skinning device for removing portions of insulation from the wire. This is accomplished by brushes brought selectively into engagement with the moving wire. The apparatus further includes a wire-severing device that moves parallel to the direction of feed of the wire so that the wire can be severed as the wire is continuously fed.

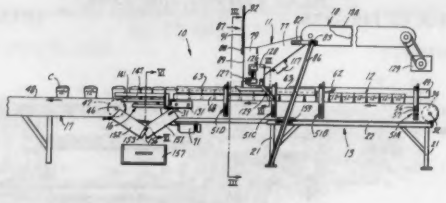
3,587,674

FRUIT-PACKAGING APPARATUS

Glenn C. Adkin, Van Buren County, Mich. (RFD #4, Box 228, South Haven, Mich., 49090)

Filed Apr. 30, 1969, Ser. No. 820,395
Int. Cl. B65b *1/22*
U.S. Cl. 141—78 **20 Claims**

A carton-filling apparatus, particularly for goods such as small fruits and vegetables, having a vibratory hopper for depositing the goods into empty cartons. The empty cartons are positioned on a conveyor in a plurality of rows and move directly under the hopper opening whereby the cartons are filled with the goods. The forward end of the carton conveyor has a vibrator attached thereto for compacting the goods within the cartons and shaking excess goods therefrom. The forward end of the conveyor is further provided with a vibrating grate thereon whereupon the filled cartons are further vibrated and separated into two laterally spaced rows. The spaced rows of cartons slide from the grate onto a second conveyor which moves at a speed faster than the carton conveyor, whereon the individual cartons in each row become spaced apart to facilitate covering or wrapping of the filled carton.

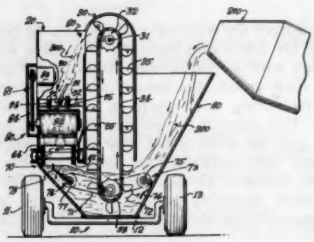


3,587,675

FLOWER POT FILLING MACHINE

Daniel A. Di Tucci, 126 Cregar St., Oceanside, Calif.

Filed Oct. 23, 1968, Ser. No. 769,830
Int. Cl. B65b *1/04, 1/30, 43/42*
U.S. Cl. 141—125 **4 Claims**



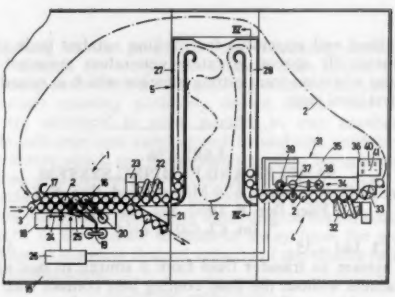
This is a machine for filling flower pots and the like with properly mixed dirt for use by nurseries and others using large quantities of flower pots, flats, and the like. In this machine the flower pots are carried by conveyor under a continuously feeding hopper. Brush means are utilized to level the filled pots to the proper depth. Excess dirt is automatically fed back into the supply hopper and returned in the continuous filling operation.

3,587,676

APPARATUS FOR SEQUENTIAL TREATMENT AND ANALYSIS OF SAMPLES

Lars Erik Oehlin, Stocksund; Jan Olof Loefvenmark, Huddinge, and Goesta Carlsson, Lidingo, Sweden, assignors to Linson Instrument Aktiebolag, Stockholm, Sweden

Filed Dec. 17, 1968, Ser. No. 784,418
Claims priority, application Sweden, Dec. 22, 1967, 17,695/1967
Int. Cl. B65b *43/54;* **B01l** *3/00*
U.S. Cl. 141—130 **13 Claims**



Apparatus for analysis or other treatment of a series of samples and having a conveyor for transporting the samples

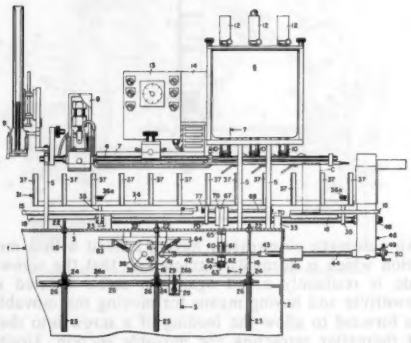
in succession from a first station in which reagents are added to a second station in which the analysis results are added to a second station in which the analysis results are detected. The conveyor includes a chain of releasably interconnected links which serve to hold one sample container each. The chain is flexible and runs between the stations without being guided laterally so as to follow a predetermined path, and therefore the length of the stretch of the chain between the stations and thus the time for transporting the samples between the stations may be varied by adding or removing links. Identification markings are provided on predetermined links and an identification system is provided for correlating the analysis results with the respective samples.

3,587,677

FEEDING MECHANISM FOR A MACHINE FOR FILLING CONTAINERS OF DIFFERENT SIZES

Percy King, Bloomington, Minn., assignor to Haskon, Inc., St. Paul, Minn.

Filed Mar. 28, 1969, Ser. No. 811,473
Int. Cl. B65b *59/04*
U.S. Cl. 141—167 **22 Claims**



A feeding mechanism for a machine for filling and closing containers of different types and sizes such as the various paper and plastic containers used for packaging milk, comprising a feed bar movable endwise through a four-stroke feed cycle wherein the means for pivotally moving the feed bar is adjustably coupled to the feed bar to vary the stroke of the pivotal movement by varying the clearing position without varying the feeding position, whereby there is a minimum pivotal stroke for each size container. The feeding elements comprise blades movable into and out of feeding position upon pivotal movement of the feed bar, the blades having a plurality of fingers that engage the containers during the advance stroke and provide for adjustment of the container support to different vertical positions relative to the feeding elements to accommodate different sizes of containers and for pivotal movement of the blades into and out of feeding position.

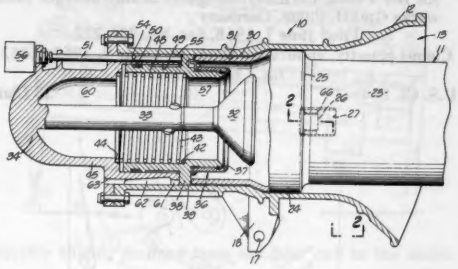
3,587,678

FLIGHT-REFUELING RECEPTACLE HAVING PRESSURE-INERTIA RELEASE VALVE

Ellsworth E. Hieber, Glendale; Thomas P. Taquino, Sierra Madre, and Frank Edward Hillery, Arcadia, Calif., assignors to Schulz Tool and Manufacturing Co., San Gabriel, all of Calif.

Filed Apr. 1, 1968, Ser. No. 717,680
Int. Cl. B64d *39/00*
U.S. Cl. 141—346 **7 Claims**

In a receptacle for the nozzle of an inflight refueling supply line, a pressure actuator, the pressure actuator having relief valve means to permit rapid emergency disconnection of the nozzle from the receptacle by the release of a lock by a lesser but highly accelerated external force on the lock than by a



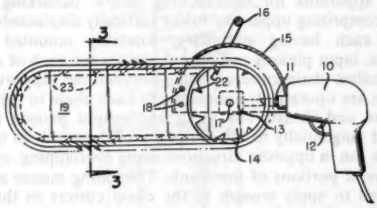
gradually increased applied external force on the lock required for unlocking and disconnection.

3,587,679

PORTABLE CABLE SAW

Joseph Conte, 1521 Mt. Read Blvd., Rochester, N.Y.

Filed May 5, 1969, Ser. No. 821,923
Int. Cl. B27b *17/02, 33/16*
U.S. Cl. 143—32 **1 Claim**



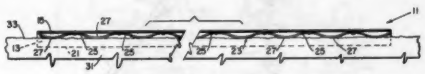
A portable power saw, similar in function to a chain saw, but comprising an endless steel cable with cutting teeth thereon instead of an endless chain. The teeth may be spot welded to the flexible cable, and the inside of the loop of cable is provided with a plurality of inwardly extending cog members which fit into recesses on a drive wheel.

3,587,680

STRAIGHT EDGE FIXTURE FOR WOODWORKING

James L. Bishop, Jr., Memphis, Tenn. (606 Kingshighway, Cape Girardeau, Mo., 63701)

Filed Apr. 8, 1968, Ser. No. 719,328
Int. Cl. B27b *27/02*
U.S. Cl. 143—157 **4 Claims**



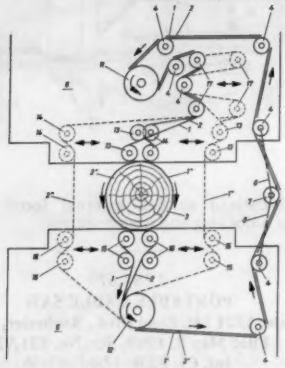
A fixture for use in woodworking having an elongated angular guide including a sinuous spring and fasteners to hold a piece of board in alignment against a saw guide and provide a straight edge for the saw to follow in cutting a straight edge across the board.

3,587,681

APPARATUS FOR DEBRANCHING AND/OR DEBARKING FELLED TREES

Georg Wehr; Gotthold Goetze, and Hans Heesch, Rotenburg An Der Fulda, Germany, assignors to Rotenburger Metallwerke GmbH, Fulda, Germany

Filed June 7, 1968, Ser. No. 735,222
Claims priority, application Germany, June 9, 1967, R46219
Int. Cl. B27l *1/00*
U.S. Cl. 144—2 23 Claims



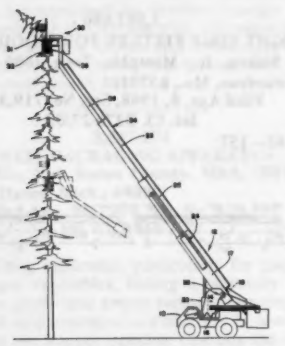
An apparatus for debranching and/or debarking felled trees comprising upper and lower vertically displaceable supports each having stationary, rotatably mounted guide pinions, input pinions and output pinions for each of at least two endless chain cutters passing between the supports. Two motors are operatively connected to each chain to drive it in traction and thrust. The input and output pinions are arranged tangentially to the periphery of the trunk so that the cutters run in opposite directions along overlapping, opposed peripheral portions of the trunk. Tensioning means are also included to apply tension to the chain cutters so that they will follow the profile of the trunk during processing.

3,587,682

TREE HARVESTER BOOM ELEVATION CONTROL

Roy D. Brownell, Aurora, and Richard E. Rogers, Oswego, Ill., assignors to Baldwin-Lima-Hamilton Corporation, Chicago, Ill.

Filed Jan. 27, 1969, Ser. No. 794,041
Int. Cl. A01g *23/02*
U.S. Cl. 144—3 11 Claims



A tree harvesting apparatus adapted to sever a standing tree into a plurality of sections, the apparatus including a tree severing means supported on a telescopic boom vertically pivotable connected to a vehicle. To automatically position severing means at a proper elevation for topping the tree, a control means is provided for controlling the number of sections to be severed from the tree and for controlling elevation of the severing means above ground level according to a predetermined elevation independent of orientation of the vehicle relative to the tree.

3,587,683

AUTOMATIC SCREWDRIVER

Kenneth R. Bangerter, Ithaca, N.Y., and John P. Law, Athens, Pa., assignors to Ingersoll-Rand Company, New York, N.Y.

Filed Feb. 7, 1969, Ser. No. 797,448
Int. Cl. B27b *17/00*
U.S. Cl. 144—32 14 Claims

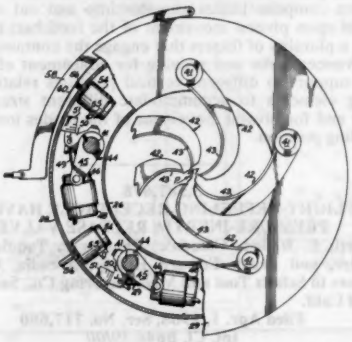
An automatic screwdriver having a head with a movable section which is normally retracted so that the screwdriver blade is resiliently urged against a screw located in the screwdriver and having means for moving the movable section forward to allow the feeding of a screw into the head and thereafter retracting the movable section. Urging the screwdriver blade resiliently against the head of the screw prevents the screw from backing up in the head when it is applied to a workpiece. Pneumatic pressure is used to move the movable section of the head forward.

3,587,684

DEBARKING MACHINE

Thomas P. Bush, Jr., 133 Red Oak Road, Birmingham, Ala., and Samuel E. Grant, 20 Honeybrook Drive, Jacksonville, Fla.

Filed Oct. 7, 1968, Ser. No. 765,388
Int. Cl. B27l *1/00*
U.S. Cl. 144—208 9 Claims



A debarking machine of the hollow head type which transfers logs along a prescribed path while progressively remov-

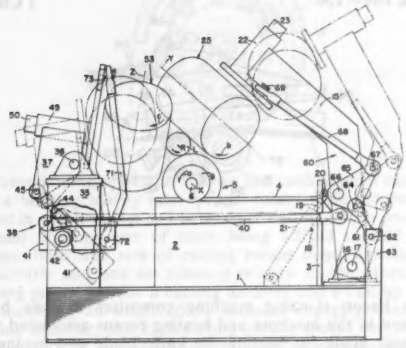
ing the bark therefrom by a plurality of debarking tools which are rotated circumferentially about the log by a rotatable tool holder. The logs are driven by a plurality of feed rolls, each feed roll including an electrical driving motor housed therein, and the debarking tools are forced against the log passing thereby by fluid cylinders supplied with fluid under pressure from a plurality of fluid pressure pumps carried by the tool holder and activated by a pumping cam as the tool holder is rotated.

3,587,685

APPARATUS AND METHODS FOR DEBARKING LOGS

Norval K. Morey, Winn, and Leward N. Smith, Remus, both of Mich., assignors to Morbark Industries, Inc., Winn, Mich.

Filed Nov. 5, 1968, Ser. No. 773,408
Int. Cl. B27l *1/00*
U.S. Cl. 144—311 **20 Claims**



Log debarking apparatus and methods wherein a log to be debarked is presented to the nip between two rotatable log turning members and a toothed debarking member, the log being rotated and simultaneously moved lengthwise to enable the debarking member to remove bark from the entire periphery of the log. The turning members are yieldably, but forcibly, maintained in engagement with the log by a fluid pressure cylinder, and the turning members are capable of relative movement toward and away from one another to enable logs of irregular cross section to be accommodated between the turning members. The speed of rotation of each turning member is the same with round logs but is automatically variable to enable the peripheral speed of each turning member to correspond to the peripheral speed of the log at the point where the latter engages the turning members to avoid slippage when debarking logs or irregular shape and ensure that both turning members are always exerting an equal torque to rotate the log. The axes of rotation of the turning members are inclined to the axis of rotation of the log, and the axes of rotation of the turning members are automatically adjusted according to the diameter of the log for varying the speed at which a log is moved lengthwise through the machine.

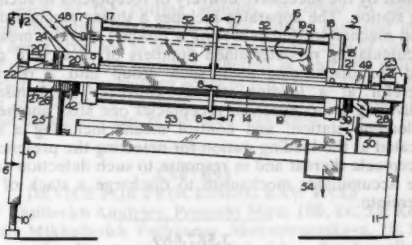
3,587,686

DEVICE FOR STEMMING CERTAIN BERRIES AND FRUITS

Robert G. Dixon, Salem, Oreg., assignor to A. B. McLauchlan Co. Inc., Salem, Oreg.

Filed May 26, 1969, Ser. No. 827,614
Int. Cl. A23n *15/00*
U.S. Cl. 146—55 **1 Claim**

A roll bed, arcuate in cross section, is composed of a series of adjacent rotating rollers of substantially the same outside diameter. The adjacent rollers are driven in opposite directions. The rollers have cooperating surfacings designed to cause stems and hulls to be drawn down between the rollers of each pair, and the entire bed is oscillated and also



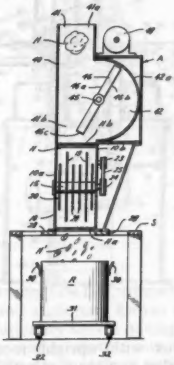
preferably slightly inclined from the inlet end to the outlet end.

3,587,687

SALAD MAKING APPARATUS

Halbert R. Hill, and Garfield C. Siverson, 3112 Produce Row, Houston, Tex.

Filed May 8, 1969, Ser. No. 823,064
Int. Cl. B26d *1/00*
U.S. Cl. 146—78 **8 Claims**



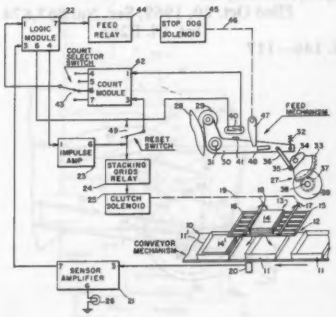
Apparatus for cutting heads of lettuce, cabbage and the like into random sizes and shapes for use in salads so that the cut pieces appear to be hand-cut.

3,587,688

DEMAND SLICER

Edward P. Toby, South San Francisco, Calif., assignor to Toby Enterprises, San Francisco, Calif.

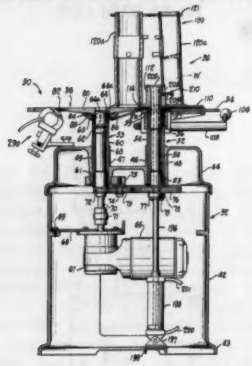
Filed June 6, 1969, Ser. No. 831,101
Int. Cl. B26d *4/46*
U.S. Cl. 146—94 **20 Claims**



Apparatus for slicing food products such as loaves of luncheon meat, for arranging such slices in stacks, and for

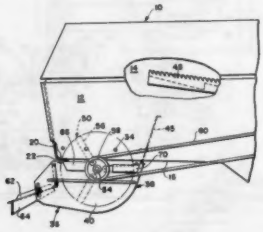
loading such stacks into receptacles therefor. The apparatus functions automatically to supply to a loading station only the number of stacks required to satisfy the demand occasioned by the successive delivery of receptacles to such loading station. The apparatus includes a slicing mechanism and feed mechanism for delivering a product thereto; means for accumulating predetermined numbers of slices into groups and for discharging each such group into a receptacle therefor at a loading station; conveyor mechanism for delivering a succession of receptacles one after another into a loading station; and control means including a sensor located at the loading station for detecting the presence of a receptacle thereat and in response to such detection causing the accumulator mechanism to discharge a stack of slices thereinto.

3,587,689
COMESTIBLE SLICING APPARATUS
Louis A. Bettcher, Amherst, Ohio, assignor to Bettcher Industries, Inc.
Continuation-in-part of application Ser. No. 561,180, June 28, 1966, now Patent No. 3,434,579. This application Dec. 19, 1968, Ser. No. 785,088
Int. Cl. B26d *1/14*
U.S. Cl. 146—105 **25 Claims**



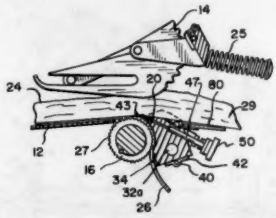
Cutting apparatus with upright receptacles that carry comestible workbodies in a circular path past a rotating knife that severs slices. The receptacles include biasing plates for the workbodies that are slidable on inclined guides to urge the workbodies downward. A table adjustment, a backup plate for slices being severed, a deflector plate for severed slices, a rod for lifting the biasing plates, a transverse severing blade, a blade sharpener, and various receptacle configurations are provided.

3,587,690
COMBINE STRAW CHOPPER MOUNTING
Charles Benjamin Peak, Geneseo, Ill., assignor to Deere & Company, Moline, Ill.
Filed Oct. 20, 1969, Ser. No. 867,674
Int. Cl. B26d
U.S. Cl. 146—117 **7 Claims**



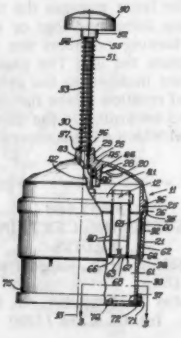
A combine has a rearward downwardly open hood and a bank of straw walkers within the hood. A straw chopper is suspended below the rearward end of the hood and receives the straw falling over the rearward end of the straw walkers, chopping the straw and discharging it rearwardly. The straw chopper is suspended from the hood by means of an improved mounting arrangement which permits the straw chopper to be mounted higher in the hood for greater clearance under the chopper and also permits relatively easy installation and removal of the chopper. The mounting device includes front and rear pairs of fore-and-aft rails on opposite sides of the hood, the front rails being offset below the rear rails. The respective rails are engaged by front and rear pairs of suspension brackets on the opposite sides of the chopper.

3,587,691
MACHINE FOR SKINNING BACON BELLIES
Earl L. Brassington; James L. Balch, both of Madison, Wis., and Harry V. Hornagold, Urbandale, Iowa, assignors to Oscar Mayer & Co., Inc., Chicago, Ill.
Filed Nov. 12, 1968, Ser. No. 774,619
Int. Cl. A22c *17/12*
U.S. Cl. 146—130 **1 Claim**



The bacon skinning machine comprises a knife blade mounted in the machine and heating means associated with the knife blade for heating the knife blade and means for maintaining the temperature of the knife blade within a predetermined range for melting the fat whereby the skin is separated from the bacon belly by a combined cutting and melting action as distinguished from either action alone. Preferably, the knife blade is retained in a pressure shoe and means are provided for accurately adjusting the distance which the cutting edge of the blade extends from the pressure shoe.

3,587,692
VEGETABLE SHREDDER
Arthur O. Nelson, Park Ridge, Ill., assignor to New-Nel Kitchens Products Company, Chicago, Ill.
Filed June 25, 1969, Ser. No. 836,493
Int. Cl. A47j *43/04*
U.S. Cl. 146—160 **7 Claims**



A vegetable shredder having a reciprocally movable shredding blade enclosed in a bell-shaped housing and a tray

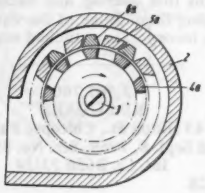
removably attached at the bell end of the housing, the interior of the bell end portion of the housing and the attached tray forming a shredding chamber which is readily opened for discharge of shredded material by removal of the tray.

3,587,693

COMMINUTING APPARATUS FOR RAW AND COOKED MEAT

Manfred Rogalski, 3261 Rumbeck Nr. 25, Rumbeck nr., and Friedrich Otto, 325 Hamelin Anton-Bruckner Str. 6, Hamelin, Germany, assignors to A. Stephan U. Sohne, Hamelin, Germany

Filed May 5, 1969, Ser. No. 822,865
Claims priority, application Germany, May 4, 1968, P 17 57 415.1
Int. Cl. A22c *11/00*; B02c *18/12*
U.S. Cl. 146—192 9 Claims



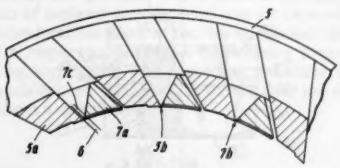
Comminuting apparatus for raw and cooked meat comprising a housing having inlet means; rotary drive means journaled in said housing; and two sets of cutting means provided in said housing, one of them being affixed to said drive means, both said sets of cutting means being annular and concentric and one set rotating relative to the other. Said cutting means include a cutting member and a cutting annulus including an intermediate annulus engaging over said cutting member, and each having cutting means one cutting means each of said intermediate annulus engages between two cutting means each of the cutting annulus, in order to define with them cutting gaps; said inlet means being arranged to admit meat into the range of the cutting means of said cutting member, and the intermediate annulus being provided on its internal cylindrical cutting means surface directed towards the cutting member with superimposed guide ribs positioned in the direction of rotation.

3,587,694

COMMINUTING APPARATUS FOR RAW AND COOKED MEAT

Manfred Rogalski, 3261 Rumbeck Nr. 25, Rumbeck, and Friedrich Otto, 325 Hamelin, Anton-Bruncker Str. 6, Hamelin, Germany, assignors to A. Stephan U. Sohne, Hamelin, Germany

Filed May 5, 1969, Ser. No. 822,866
Claims priority, application Germany, May 4, 1968, P 17 57 414.0
Int. Cl. A22c *11/00*; B02c *18/12*
U.S. Cl. 146—192 9 Claims



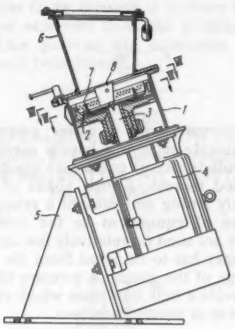
Comminuting apparatus for raw and cooked meat comprising a housing having inlet means; rotary drive means journaled in said housing; and two sets of cutting means provided in said housing, one of them being affixed to said drive means, whereby both said sets of cutting means are positioned on one annulus each rotating concentrically and relatively to each other whereby said cutting means take the form of a cutting member and a cutting annulus engaging over said cutting member, whereby one cutting means each of an intermediary annulus engages between two cutting means each of the cutting annulus, in order to define between them the exact width of the cutting gap; said inlet means being arranged to admit meat into the range of cutting means of said cutting member, wherein at least one cutting edge each of the two cutting edges of the cutting annulus and of the intermediary annulus, defining between them the width of the cutting gap, is provided with teeth.

3,587,695

DEVICE FOR PROCESSING RAW FATS

Viktor Vasilievich Anufriev, Prospekt Mira, 180, kv. 33; Konstantin Mikhailovich Vechkanov, Metrostroevskaya, 18, kv. 11, and Konstantin Feoktistovich Zemlyannikov, Universitetskay prospet, 23, korpus 1, kv. 69, all of Moscow, U.S.S.R.

Filed June 3, 1969, Ser. No. 829,939
Claims priority, application U.S.S.R., June 3, 1968, 1244014
Int. Cl. B02c *18/12*
U.S. Cl. 146—192 4 Claims



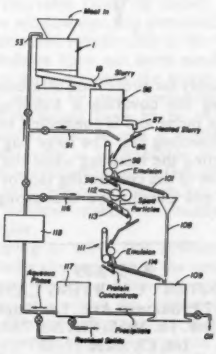
A device for processing raw fats, wherein the drum accommodates moveable and stationary knives adapted for crushing raw stock, the stationary knives having each two working blades—a longer one and a shorter one, the latter working blade forming with the drum surface a clearance adjustable with the aid of a special arrangement, while the drum is provided on the external surface with vanes.

3,587,696

COCONUT TREATING APPARATUS FOR PROCESS

H. Bradley Fairchild, P. O. Box 448, Woodside, Calif.

Filed Oct. 5, 1966, Ser. No. 584,452
Int. Cl. C11b *1/00*; A23n *15/00*
U.S. Cl. 146—222 22 Claims



A process for separating the natural oil from fresh coconut meat comprising finely comminuting the meat into a flowable

slurry, raising the temperature of the slurry, pinch pressing the heated slurry to separate liquid constituents therefrom, including oil, and centrifuging said slurry to separate the natural oil from the solid fibrous constituents and other aqueous phase constituents. An apparatus for performing the process is also disclosed.

3,587,697
BULK CONTAINER WITH REMOVABLE YOKE
Lennart Silfverskiold, Strandvagen 6, Stockholm, Sweden
Filed Jan. 6, 1969, Ser. No. 789,125
Int. Cl. B65d *25/22, 33/14, 89/02*
U.S. Cl. 150—.5 **5 Claims**

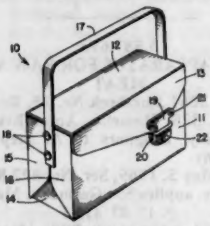
A container formed with a collar extension which is adapted to removably receive a handle member. The prior art is aware of bulk transport containers equipped with a lifting yoke attached thereto. Lifting yokes of the type used must be relatively strong and present a relatively expensive and heavy piece of equipment to the combination even though the yokes are used on relatively few occasions such as when the container has to be lifted from the top and at the point of discharge of the goods. A primary object of this invention is to provide a bulk container which can utilize readily removable yokes or handle members.

3,587,698
CARRYALL ASSEMBLY
Terry Ritter, 137 E. 38th St., New York, N.Y.
Filed Feb. 19, 1969, Ser. No. 800,614
Int. Cl. A45c *3/06*
U.S. Cl. 150—35 **2 Claims**

A carryall assembly for protection of a handbag in which a large carrying bag for covering a handbag is folded and stored in a smaller purse and is connected to the small purse by means of a connecting tab. The large bag is removed during use for protecting the handbag while the smaller purse is appended by means of the connecting tab for storage of small items. Both bag and purse have drawstrings to enable individual closure.

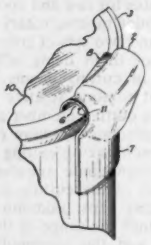
3,587,699
UNITARY CARRYING CASE
Emil Kovach, 3757 Primavera Ave., Los Angeles, Calif.
Filed Dec. 16, 1968, Ser. No. 783,993
Int. Cl. A45c *11/38*
U.S. Cl. 150—52 **6 Claims**

A unitary carrying case is erected from a blank stamped from flexible sheet material. The blank has crease lines defining a plurality of serially aligned panels that can be easily folded into tubular shape. Opposing sides of the case have



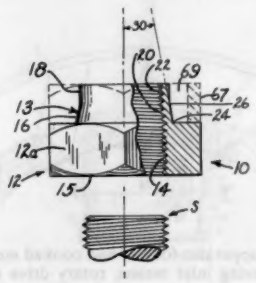
mating wing walls that overlap and become secured to associated upstanding flaps. None of the carrying case corners or other sections incorporate a stitched seam.

3,587,700
RIM GUARD
Albin J. Mauer, 43 Hilton St., Chicopee Falls, Mass.
Filed Sept. 8, 1969, Ser. No. 856,098
Int. Cl. B65d *25/34*
U.S. Cl. 150—52R **7 Claims**



A plastic snap on protector for covering the protruding members of removable rims that seal drums, barrels and the like, to guard against injury.

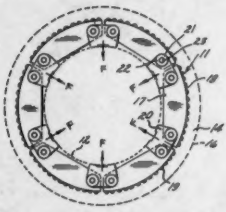
3,587,701
THREAD LOCKING MEANS
Harold Gold, 3645 Tolland Road, Shaker Heights, Ohio, and Fred Macks, 1231 Normandy Terrace SW, Seattle, Wash.
Continuation-in-part of application Ser. No. 679,385, Oct. 31, 1967, now abandoned. This application July 8, 1969, Ser. No. 839,916
Int. Cl. F16b *39/284*
U.S. Cl. 151—21 **11 Claims**



A self-locking fastener makes use of the locking forces that are generated when a rigid, cylindrical threaded member is threaded into an elastically expandable, cylindrical threaded

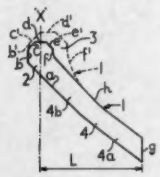
bore having a smaller pitch diameter than that of the cylindrical member. A threaded conical section leads into the cylindrical locking bore to provide for guiding the cylindrical member into the locking threads.

3,587,702
SAFETY RIM AUXILIARY
Clyde F. Kaunitz, 1150 N. Lake Shore Drive, Apt. 4-A, Chicago, Ill.
Filed Nov. 14, 1966, Ser. No. 594,145
Int. Cl. B60b *25/22*; **B60c** *17/04*
U.S. Cl. 152—158 **5 Claims**



A plural link girdling structure in which all connections as between links are conic and tension the entire girdling structure thereby seating the structure in the rim throat of an automobile wheel and providing an auxiliary support for the tire tread when deflation of the tire occurs. The structure includes the concept of stanchions in position at link connections whereby the radial component force of the tension is radially applied inwardly to the wheel rim throat.

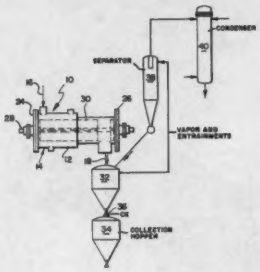
3,587,703
GIANT TIRES
Jean Hanus, Montlucon, France, assignor to The Dunlop Company Limited, London, England
Filed June 28, 1968, Ser. No. 741,050
Claims priority, application France, July 5, 1967, 113,147
Int. Cl. B60c *11/08*
U.S. Cl. 152—209 **18 Claims**



A pneumatic tire provided with a tread comprising a plurality of sets of inclined bars disposed one set on each side of the midcircumferential plane of the tire in opposed directions one set with respect to the other, the wearing properties of one set being asymmetric with respect to the other, set such that substantially even wear ensures during road use of which the following is a specification.

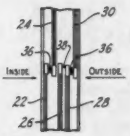
3,587,704
THIN FILM PROCESSING METHOD
Leo J. Monty, Reading, Mass., assignor to Artisan Industries Inc., Waltham, Mass.
Filed Sept. 5, 1968, Ser. No. 757,646
Int. Cl. B01d *1/24, 5/00*
U.S. Cl. 159—6 **5 Claims**

A sodium alkoxide-methanol solution is continuously concentrated to a powder in a horizontally axised thin-film evaporator in a single pass. The vapor flow in the evaporator is concurrent and aids in the removal of the powdered sodium alkoxide from the evaporator where it is discharged into a collection vessel. The vapor stream with entrained sodium



alkoxide particles flows through a cyclone separator where the particles are removed from the methanol stream. The removed particles pass to the collection vessel and the methanol stream is condensed.

3,587,705
REPLACEMENT WINDOW UNIT
Charles M. Zappone, 841 Pellis Road, Greensburg, Pa.
Filed Dec. 26, 1968, Ser. No. 787,023
Int. Cl. E06b *3/32*
U.S. Cl. 160—91 **6 Claims**



This is a replacement window unit primarily designed for rehabilitation of older dwelling houses. The invention is primarily related to effectuating a five track unit wherein two storm panels, a screen panel and two regular glass panels are all embodied in one unit traveling on parallel tracks each panel being independently adjustable and having a latch mechanism operable only from the inside so that the window may not be operated by burglars substantially from the outside. Being of compact thickness with adjacent panels substantially touching or effectively touching, each panel is easily and simply removable from the frame. The frame is adjustable to fit the window opening provided, and the windows are in a tight, rattle-free relationship to the frame.

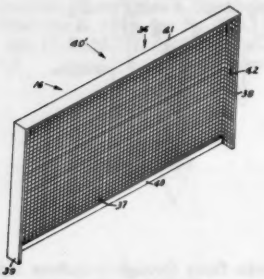
Five track windows have not been produced in the prior art because in accordance with the usual design principles, such a window would be quite impractical. For example, either the window would have to be very thick with the tracks widely spaced apart or else it would be impossible to adjust the outside panel as for example moving it out of the top position without removing all of the other panels in front of it or else by providing operable catches or releases on the outside of the window making it readily available to be opened by a burglar.

A feature helping to solve this problem is a system of stepped downwardly sloping toward the outside, top and bottom interior frame surfaces. Thus when the outside lower panel is in the raised position, the lower portion thereof having the catch lever mechanism thereon is exposed below the bottom of the upper section. Likewise the sides are stepped inwardly toward the outside of the building. The many features of the invention which provide an operable unit of this type will be explained in the detailed description.

3,587,706
AUTOMOBILE WINDOW SCREEN

John R. Widmer, and Elva G. Widmer, 468 Abrams St., Green Bay, Wis.

Filed Apr. 18, 1969, Ser. No. 817,463
Int. Cl. E06b 7/02
U.S. Cl. 160—105 14 Claims

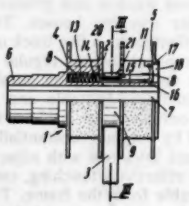


An automobile window screen comprising a pliant mesh screen mounted across the face of a resilient thin strip U-shaped frame, said frame being adapted to seat on the web portions of the window guide channels of a conventional automobile window structure, and said frame being substantially as wide as the webs of said guide channels and being of a thinness adapted to occupy the space between the edges of the associated window glass and the webs of said guide channels, thereby permitting the window glass to be raised and lowered in said guide channels without interference of said window screen also disposed in said guide channels.

3,587,707
SUSPENSION BAND OF A VENETIAN BLIND OR THE LIKE

Gunther Breymann, Emmerich, Germany, assignor to Justin Huppe, Oldenburg, Germany

Filed May 12, 1969, Ser. No. 823,897
Claims priority, application Germany, May 21, 1968, 62765
Int. Cl. E06b 9/384
U.S. Cl. 160—178 8 Claims



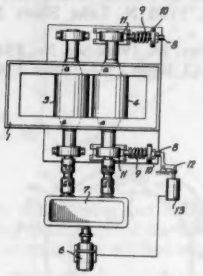
A venetian blind with structure for readily replacing the suspension tapes or bands including a wire hoop or latch member mounted in a slot in the winding drum and retractable against a spring which normally biases it to tape retaining position.

3,587,708
METHOD OF CONTINUOUS SHEET METAL PRODUCTION

Georgy Lukich Khimich, ulitsa Lenina, 53, kv. 92; Vitaly Maximovich Niskovskikh, ulitsa Festivalnaya, 21, kv. 60, and Stanislav Evgenievich Karlinsky, ulitsa Kultury, 4, kv.22, Sverdlovsk, U.S.S.R.

Filed Feb. 21, 1968, Ser. No. 707,087
Int. Cl. B22d 17/32, 1/02
U.S. Cl. 164—4 2 Claims

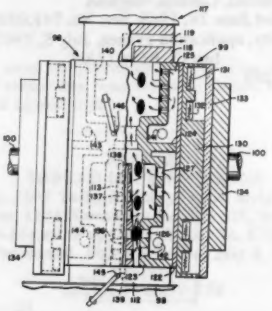
A method of continuous sheet metal production is provided, which comprises immersing water-cooled rolls into a bath of molten metal to such a depth that the molten metal contacts the rolls over a portion of their cylindrical surfaces corresponding to central angles greater than 180° and rotating the rolls in opposite directions to discharge crystallized metal from the bath in the shape of a sheet. One of the rolls is pressed against the surface of the sheet being processed and the speed of rotation of the rolls is controlled such that any deviation in the desired thickness of the outcoming sheet is compensated by variation in speed of rotation of the rolls.



3,587,709
FOUNDRY SAND FORMING METHOD

Leon F. Miller, Rocky River, and Henry J. Herbruggen, Westlake, Ohio, assignors to The Sherwin-Williams Company

Division of Ser. No. 516,634, Dec. 27, 1965, Pat. No. 3,439,733.
Filed Mar. 10, 1969, Ser. No. 828,039
Int. Cl. B22c 9/12, 15/24
U.S. Cl. 164—12 4 Claims



A foundry molding process and machine for producing molds or cores from a sand resin mix by blowing the same into a patterned box and using a low temperature cure accelerator such as warm air which is permeated through the sand article through the box blow vents and which is exhausted through an exhaust port of a pressure pad clamped over the box.

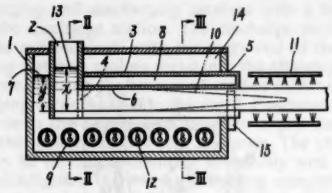
3,587,710
A METHOD OF CONTINUOUSLY CASTING METALS

Tatsuo Kuratomi, 4-2-18, Hamatake, Chigasaki Kanagawa Prefecture, Japan

Filed Feb. 25, 1969, Ser. No. 802,124
Claims priority, application Japan, Nov. 7, 1968, 43/80971
Int. Cl. B22d 23/00
U.S. Cl. 164—81 3 Claims

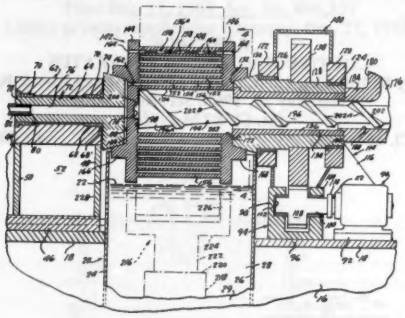
This invention is to cast metals continuously by using a

substance which is higher in the specific gravity but lower in the melting point than a metal to be cast and which has a property of producing no alloy or compound with the molten metal by using a horizontally set channel type casting mold.



3,587,711
A METHOD FOR CONTINUOUSLY CASTING METAL SHEET OR STRIP

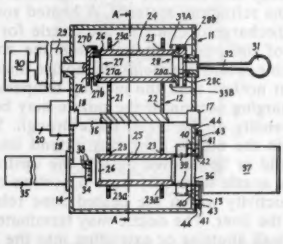
Frank A. Russo, 1741 Bears Den Road, Youngstown, Ohio
Division of Ser. No. 666,067, Sept. 7, 1967, Pat. No. 3,511,307.
Filed Oct. 15, 1969, Ser. No. 871,331
Int. Cl. B22d *11/06*
U.S. Cl. 164—83 **10 Claims**



The apparatus for practicing the process comprises a rotatable drum having an internal involute metal casting chamber which is center charged from a continuous source of molten metal, a water cooling jacket for the chamber to effect solidification of the molten metal as it travels its volute path to a discharge opening communicating with the chamber, together with apparatus externally located relative to the drum to effect a cooling of the cast metal.

3,587,712
ROTARY CARRIER METHOD AND APPARATUS FOR CENTRIFUGAL CASTING

Alan Dearden; Edgar O. G. Castell, and Leslie Hylton, all of St. John's Works, Bradford, England, assignors to Hepworth & Grandage Limited, Bradford, England
Filed Oct. 25, 1968, Ser. No. 770,507
Claims priority, application Great Britain, Oct. 30, 1967, 49244/67
Int. Cl. B22d *13/02*
U.S. Cl. 164—114 **11 Claims**



The disclosure relates to a centrifugal casting apparatus and process wherein dies are displaced around a circular path between casting and ejection stations by a carrier, the dies and the carrier being rotatable about horizontal axes.

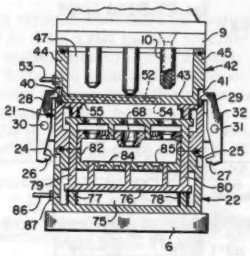
3,587,713
PRODUCTION OF MOULDS AND CASTINGS

Gordon Halsey, Oswestry, England, assignor to Monsanto Chemicals Limited, Monsanto House, London, England
Filed June 11, 1968, Ser. No. 735,959
Claims priority, application Great Britain, June 28, 1967, 29784/67
Int. Cl. B22d *29/00;* **B22c** *9/04*
U.S. Cl. 164—131 **11 Claims**

Production of a ceramic shell mould for use in metal casting which comprises forming on a disposable pattern a shell mould, removing the pattern, firing the mould, casting metal into said mould, solidifying said metal and removing said mould from said solidified metal. The shell mould is characterized by containing a particulate ceramic refractory material, a binding agent and an inorganic material which loses carbon dioxide upon firing to form an oxide.

3,587,714
FOUNDRY SAND ARTICLE FORMING MACHINE

Robert W. Ellms, and Edward D. Abraham, Cleveland, Ohio, assignors to The Sherwin-Williams Company
Filed Feb. 26, 1968, Ser. No. 708,022
Int. Cl. B22c *15/22*
U.S. Cl. 164—201 **15 Claims**



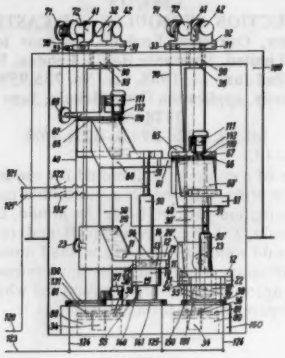
Foundry sand article forming machine and method utilizing a sand-resin mixer, blowing the mix into a horizontally split mold box; a gassing head which can be moved above the box and clamped thereto with an air line connected thereto and an injector operative to insert a predetermined amount of catalyst into the line to be blown through the mold at high pressure to cure the mix; unlocking the box halves while locking the upper half to the gassing head, unclamping the box vertically to separate the halves with stripping mechanisms incorporated in each half.

3,587,715
PLANT FOR PRODUCING INGOTS DIFFERING IN SIZE BY AN ELECTRIC REMELTING OF METAL

Wolfgang Holzgruber, and Otmar Kleinhagauer, Kapfenberg, Austria, assignors to Gebr Bohler & Co., Aktiengesellschaft, Vienna, Austria
Filed Dec. 12, 1968, Ser. No. 783,270
Claims priority, application Austria, Dec. 14, 1967, 11259/67
Int. Cl. B22d *27/02*
U.S. Cl. 164—252 **9 Claims**

Two electrode holders are operated in alternation to in-

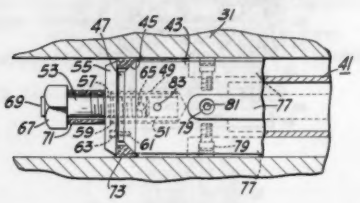
troduce electrodes to be remelted in close succession into one of two molds. One of said electrode holders is operated from time to time to introduce electrodes to be remelted into the other of said two molds.



3,587,716
STARTING BAR FOR HORIZONTAL CONTINUOUS CASTING APPARATUS

Joseph J. Ciochetto, Allison Park, Pa., assignor to Koppers Company, Inc.

Filed July 10, 1968, Ser. No. 743,730
Int. Cl. B22d 11/08
U.S. Cl. 164—274 **7 Claims**



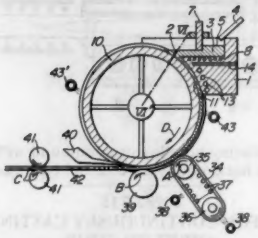
A starting bar for use with a horizontal continuous casting mold includes an elongate member having surface grooves adjacent the end to be inserted into the mold, with wearing pieces secured in the grooves to maintain the end of the bar in spaced relation from the walls of the mold. Resilient material disposed between the end of the bar and a cap piece is compressed to engage the walls of the mold and form a seal.

3,587,717
APPARATUS FOR PRODUCING GRIDS OF STORAGE BATTERIES

Shinya Yamauchi, Osaka, and Minoru Morita, Toyonaka-shi, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 21, 1968, Ser. No. 769,266
Claims priority, application Japan, Oct. 25, 1967, Sept. 25, 1968, 68486/67;69487/67;70658/68;70657/68
Int. Cl. B22d 11/06
U.S. Cl. 164—276 **8 Claims**

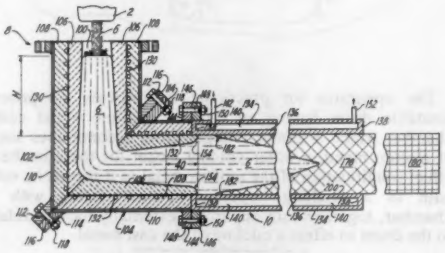
An apparatus for producing grids of storage batteries, wherein a rotary mold, having grid casting grooves formed in the peripheral surface thereof, and a stationary mold are arranged in confronting relation to each other and molten lead or a molten lead alloy is poured into a gap defined between said molds, whereby defect-free, thin, excellent grids are obtained.



3,587,718
CONTINUOUS CASTING APPARATUS

Robert K. Hopkins, 15 St. Austin's Place, Staten Island, N.Y.

Filed May 22, 1968, Ser. No. 731,017
Int. Cl. B22d 11/10
U.S. Cl. 164—281 **12 Claims**



Apparatus for continuous casting of metals, having a nozzle with a charging section and a discharging section. A liquid cooled continuous casting mold having an entry end and a discharge end. The nozzle has a molten metal receiving opening in a charging section and a molten metal discharge opening in the discharge section communicating with the entry end of the mold. The nozzle has a liner of refractory material and may also have an insulating material disposed externally of the refractory material. A heated zone disposed adjacent the discharge opening of the nozzle for preventing solidification of the molten metal within the zone. In one form, the heating means maintains the nozzle liner within the heated zone at no less than the melting temperature of the metal. The charging section of the nozzle may be heated to maintain flowability of the metal therethrough. Such an assembly wherein the nozzle liner may extend into the entry end of the mold or be abutted against the upstream end of the mold. The nozzle liner may have a portion of increased thermal conductivity within the heated zone relative to the remainder of the liner. The nozzle may terminate in a transverse heated wall abutting or extending into the mold. Sealing means, preferably having insulating properties, disposed

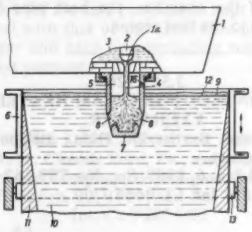
intermediate the liner and the mold. Lubricating reservoirs disposed within the mold wall communicating with the mold interior. A method of continuous casting wherein a nozzle has charging and discharging sections with a heated zone within the discharge section. The discharge section is positioned to communicate with the entry end of the mold. Introducing a stream molten metal into the charging section of the nozzle, passing the stream of molten metal through the discharging section and into the mold. Continuously heating the nozzle in the heated zone in order to prevent solidification of the molten metal within this zone. The charging section may be heated to maintain flowability with or without some solidification therethrough. Passing completely molten metal to the mold for solidification initiated at a point within the mold longitudinally spaced from the nozzle.

3,587,719

MOLTEN METAL SUPPLY APPARATUS FOR PREVENTING OXIDE CONTAMINATION IN CONTINUOUSLY CAST STEEL PRODUCTS

Hans Schrewe, Duisburg; Helmut Kobusch, Duisburg-mundelheim; Wolf-Dietrich Liestmann, Duisburg-Grossenbaum; Wolfhard Carius, Duisburg-Huckingen; Hans Vom Ende, Duisburg-Rahm; Klaus Frenken, Muhlheim (Ruhr), and Gerd Vogt, Krefeld, Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Dec. 11, 1969, Ser. No. 884,337
Claims priority, application Germany, Dec. 21, 1968, P 18 17 067.7
Int. Cl. B22d *11/10*
U.S. Cl. 164—281 **7 Claims**



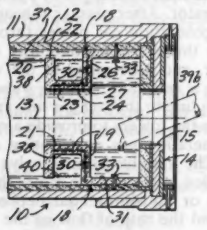
For continuous casting of steel, the steel is poured in free fall into a chamber having bottom below the surface level of the liquid steel in the mold and having lateral openings above the bottom to cause the poured-in steel to change the direction of flow at least twice before being introduced into the mold at a considerably reduced speed as compared with the speed of the poured, free falling stream.

3,587,720

APPARATUS FOR CENTRIFUGALLY CASTING AN ARTICLE WITH AN INTERNAL FLANGE

Walter H. Bade, Huron, Ohio, assignor to Sandusky Foundry & Machine Company, Sandusky, Ohio

Filed Sept. 20, 1968, Ser. No. 761,268
Int. Cl. B22d *13/10*; B22c *9/08*
U.S. Cl. 164—302 **3 Claims**



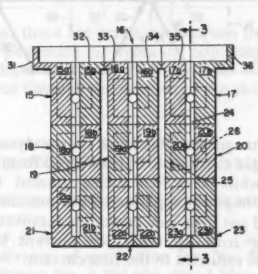
Centrifugally casting a tubular article having at least one internal flange. A refractory core is placed in an elongated tubular mold. The core includes a dam member and a flange chamber. An initial pour of molten metal is introduced into the mold on one side of the core. The initial layer of metal is cooled until a seal is formed between the dam member and the tubular wall. A second pour of molten metal is made on the other side of the dam member. This second layer of molten material fills the flange chamber by passing through a series of passageways leading into such flange chamber. Subsequently, the casting is cooled and removed from the mold.

3,587,721

CERAMIC GANG MOLD

Roy C. Feagin, Mountain Lakes, N.J., assignor to Howmet Corporation, New York, N.Y.

Filed Jan. 12, 1968, Ser. No. 697,373
Int. Cl. B22c *9/20*
U.S. Cl. 164—350 **6 Claims**



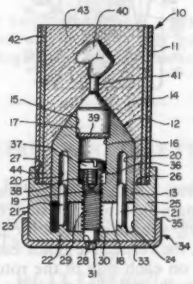
A composite ceramic shell mold for casting metal comprising a number of mold units ganged together so that all may be filled with molten metal through a single gate, each mold unit having a body of a standardized size and shape and differing from other units only in the presence or absence of certain extensions on that body, whereby all units may be made in one die in which inserts corresponding to the extensions are removed or put in place as required.

3,587,722

ADJUSTABLE CRUCIBLE FORMER FOR DENTAL MOLDING FLASK

Robert B. Slansky, Cicero, Ill. (2517 S. Avers Ave., Chicago, Ill. 60623)

Filed Aug. 12, 1968, Ser. No. 751,945
Int. Cl. B22c *21/10*, *9/04*
U.S. Cl. 164—376 **9 Claims**



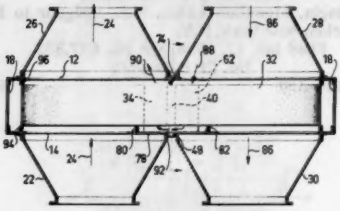
Molding or casting apparatus for producing dental inlays, crowns, and the like wherein the crucible former utilized in conjunction with the molding flask is manually adjustable so as to permit varying of its position and the position of the wax pattern within the molding flask.

3,587,723

TRANSFERRER OF THE THERMODYNAMIC CHARACTERISTICS OF TWO GASES

Per Gunnar Norback, Lidingo, Sweden, assignor to Carl Georg Munters, Stocksund, Sweden

Filed July 17, 1968, Ser. No. 745,431
Claims priority, application Sweden, July 20, 1967, 10725/67
Int. Cl. F28d *19/00*
U.S. Cl. 165—5 4 Claims



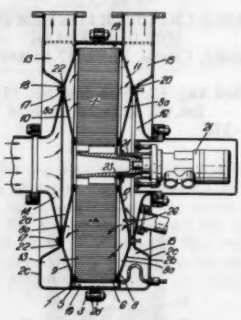
A rotary exchanger in which the thermodynamic characteristics of two gas currents are transferred from one current to the other while they are being passed through the exchanger body in zones separated from one another and in which entrapped gas from one current is removed in an intermediate purging zone by the other current being passed therethrough and returned to the first current.

3,587,724

ROTARY REGENERATIVE HEAT EXCHANGERS

Waldemar Hryniszak, North Shields, England, assignor to Clarke, Chapman & Co., Limited, Gateshead, England

Filed Apr. 28, 1969, Ser. No. 819,822
Claims priority, application Great Britain, Apr. 29, 1968, 20,297/68
Int. Cl. F23l *15/04*
U.S. Cl. 165—8 14 Claims



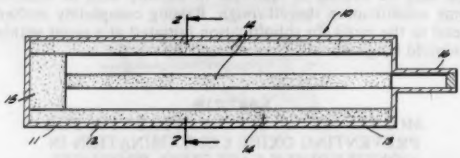
A rotary regenerative heat exchanger has a disc-form rotor mounted in a casing which, on each side of the rotor, defines a pair of concentric spaces or ducts for the fluids that flow through the rotor, the respective fluids each passing through one of the spaces on each side of the rotor. Apertures from said spaces to mutually sealed segmental portions of the rotor keep the fluid flows separate from each other. The casing structure includes an outer envelope which with inner members defines the concentric spaces, the inner members themselves cooperating with the sealing means of the rotor and being arranged to be able to accommodate thermal expansion without imposing asymmetrical stresses on the outer envelope.

3,587,725

HEAT PIPE HAVING A SUBSTANTIALLY UNIDIRECTIONAL THERMAL PATH

Algerd Basiulis, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 16, 1968, Ser. No. 767,956
Int. Cl. G05d *23/00*; F28d *15/00*
U.S. Cl. 165—32 5 Claims



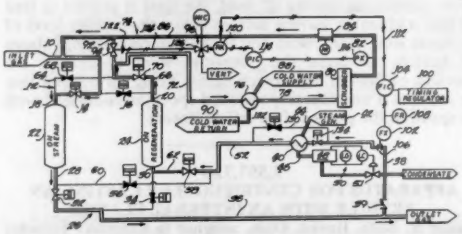
The disclosed heat pipe includes a hermetically sealed chamber having first and second heat transfer regions. A fluid capturing wick located in the vicinity of the first region and a capillary wick containing a volatile working fluid are disposed within the chamber. The capillary wick extends from the first to the second region of the chamber. When heat is applied to the first region, the heat pipe acts as a thermal conductor, transferring heat from the first region to the second region by means of the evaporation and subsequent condensation of the working fluid. The condensed working fluid returns to the first region of the chamber by capillary action via the capillary wick. When heat is applied to the second region of the chamber, the heat pipe functions to prevent heat flow to the first region.

3,587,726

OUTPUT CONTROL FOR STEAM HEATED HEAT EXCHANGER

Silvester C. Leonard, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Jan. 6, 1969, Ser. No. 789,162
Int. Cl. B60h *1/00*
U.S. Cl. 165—39 4 Claims

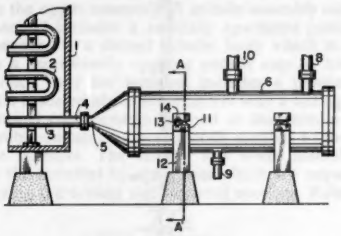


A multiple tower gas dehydration system is disclosed wherein the regeneration gas is heated in a steam heated heat exchanger, with the heat exchanger in open communication with a steam generator. After passage through the regenerating tower, the regeneration gas passes through dehydrating components, then through a continuously operated motor-driven compressor, and is returned to the wet gas input. A bypass including a variable control valve is connected between the return line to the wet gas line and the regenerating gas outlet from the towers to provide a recirculating loop through the regeneration gas dehydrating components and the compressor. The variable control valve is automatically selectively controlled in response to either the pressure in the recirculating loop or the differential between a timed flow regulator signal and the rate of flow of the regenerating gas through the heat exchanger, whereby this control valve provides regulated control over the flow of regeneration gas for regulated gradual change in demand upon the steam generator.

3,587,727
SUPPORTING ELEMENT FOR MOUNTING HEAT EXCHANGER FOR QUENCHING THERMALLY CRACKED GAS

Ichiro Tokumitsu, Tokyo; Mitsumaro Okamura, and Souji Asano, Tokuyamashi, Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Filed July 30, 1969, Ser. No. 845,957
Claims priority, application Japan, Aug. 17, 1968, 43/70497
Int. Cl. F28f 9/00
U.S. Cl. 165—68 **1 Claim**



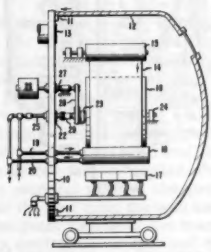
A supporting element which comprises at least one roller and a roller-bearing frame and is used to support a horizontal heat exchanger for quenching a thermally cracked gas in such a way that the heat exchanger can move in a horizontal direction in accordance with thermal expansion.

The element is inserted between each of the projections equipped on both sides of the shell of the heat exchanger with the bottom of the said projections kept at approximately the same level with that of the centerline of the inlet of the heat exchanger and each corresponding support to the projection for that purpose.

3,587,728
HEAT TRANSFER SUPPLY FOR VACUUM METALIZER

Edward De Buhr, Chadds Ford, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 13, 1969, Ser. No. 798,865
Int. Cl. F28f 5/02
U.S. Cl. 165—89 **3 Claims**



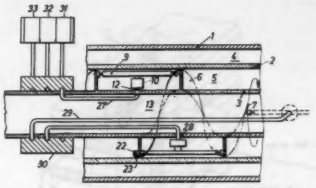
An improved means for supplying heat transfer fluid and torque to a drum in a vacuum chamber through the use of a drive shaft separate from an axial fluid supply shaft.

3,587,729
DOUBLE-WALLED TUBULAR HEAT EXCHANGER

Wolfhart Eisenmann, Ravensburg, Germany, assignor to Escher Wyss G.m.b.H., Ravensburg, Wurttenberg, Germany

Filed Aug. 29, 1969, Ser. No. 854,048
Claims priority, application Germany, Sept. 6, 1968, P 17 94 098.6
Int. Cl. F28g 3/12
U.S. Cl. 165—94 **5 Claims**

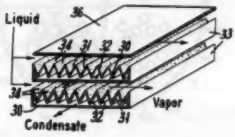
In a double-walled tubular heat exchanger, more particularly crystallization cooler, having scraper blades which are arranged internally and abut against the inner wall, and which are secured to a rotatable shaft extending in the axial direction, the improvement that for pressing the scraper blades against or lifting them away from the inner wall of the heat exchanger there are arranged between the blade holders and the shaft pneumatic or hydraulic adjusting devices whose pressure medium chambers communicate with an external pressure source through the interior of the shaft.



3,587,730
HEAT EXCHANGE SYSTEM WITH POROUS BOILING LAYER

Robert M. Milton, Chappaqua, N.Y., assignor to Union Carbide Corporation

Division of Ser. No. 717,691, Apr. 1, 1968, Pat. No. 3,523,577, which is a division of application Ser. No. 366,853, May 12, 1964, now Patent No. 3,384,154, dated May 21, 1968, which is a continuation-in-part of application Ser. No. 849,608, Oct. 29, 1959, now abandoned, which is a continuation of application Ser. No. 607,233, Aug. 30, 1956, now abandoned; said 366,853 is a continuation-in-part of application Ser. No. 849,665, Oct. 29, 1959, now abandoned, which is a division of application Ser. No. 607,233, Aug. 30, 1956, now abandoned. Filed June 15, 1970, Ser. No. 46,291
Int. Cl. F28f 3/02; F28b 1/02
U.S. Cl. 165—110 **3 Claims**



A tube-type heat exchanger having a porous layer bonded to one wall and constructed of thermally conductive particles integrally bonded together to form interconnected pores of capillary size.

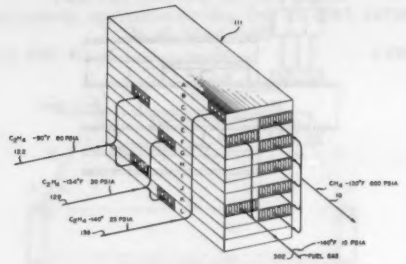
3,587,731
PLURAL REFRIGERANT TRAY TYPE HEAT EXCHANGER

George E. Hays, Bartlesville, Okla., assignor to Phillips Petroleum Company

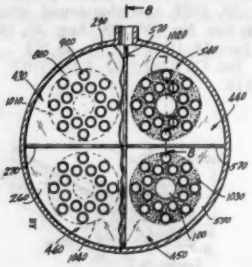
Continuation of application Ser. No. 510,269, Nov. 29, 1965, now abandoned. This application July 22, 1968, Ser. No. 752,118
Int. Cl. F28d 9/00
U.S. Cl. 165—140 **10 Claims**

A core type heat exchanger comprising a plurality of parallel, contiguous and separate passageways positioned in an insulated shell and arranged one above the other with the bottom of one passageway constituting the top of the passageway immediately below wherein means are provided for introducing refrigerants at different temperature levels

into passageways in countercurrent flow relationship with respect to the process stream being cooled at loci in the heat exchanger corresponding to the temperature levels of the individual refrigerants.



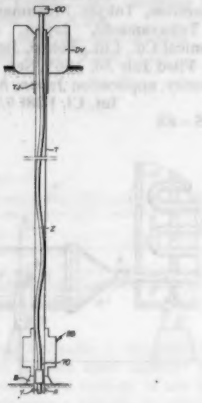
3,587,732
HEAT EXCHANGER FORMED BY MODULES
Frederick A. Burne, Hamden, Conn., assignor to Olin Mathieson Chemical Corporation
Division of Ser. No. 692,913, Dec. 22, 1967, now abandoned. Filed Aug. 14, 1969, Ser. No. 862,131
Int. Cl. F28f 9/02, 1/10
U.S. Cl. 165—158 5 Claims



A heat exchanger is formed of heat exchanger units which each have a section of the header and a porous material with a multiplicity of tubes embedded therein with the tubes communicating with the header section. The units are assembled and joined together to form headers.

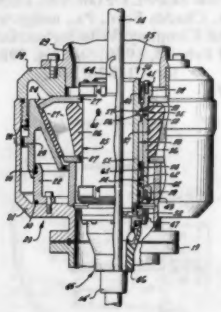
3,587,733
METHOD OF ROTATABLY RELEASING A TUBULAR RUNNING STRING FROM A FLOATING DRILLING VESSEL
William F. Miller, Ventura, Calif., assignor to Vetco Offshore Industries, Inc., Ventura, Calif.
Filed Nov. 1, 1968, Ser. No. 772,717
Int. Cl. E21b 43/01
U.S. Cl. 166—.5 16 Claims

Casing is run in a well underlying the ocean from a floating vessel by a tubular running string attached to a casing hanger by left-hand threads. The casing hanger is landed in a hanger body fixed to the ocean floor and locked in place. The casing is then cemented in place, whereupon the running string is rotated while applying fluid pressure to its interior, which exerts a lifting force at the top of the running string and supports a major portion of its weight, thereby relieving the threads of such weight and of the accompanying friction.



This facilitates complete unthreading of the running string from the casing hanger.

3,587,734
ADAPTER FOR CONVERTING A STATIONARY BLOWOUT PREVENTER TO A ROTARY BLOWOUT PREVENTER
Donald U. Shaffer, Whittier, Calif., assignor to Shafco Industries, Inc.
Filed Sept. 8, 1969, Ser. No. 855,852
Int. Cl. E21b 33/00; F21b 7/12
U.S. Cl. 166—.5 12 Claims

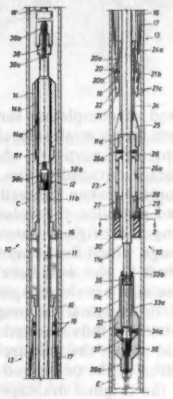


An adapter for converting a stationary blowout preventer to a rotary blowout preventer includes a housing with a cylindrical outer surface for being sealingly engaged by the blowout preventer rubber seal, a radially outwardly extending flange on either axial end thereof for engagement with the metal reinforcing of the rubber seal upon relative axial displacement therebetween to halt the displacement, and a tubular inner member rotatably mounted within the housing and itself mounting a seal for sealingly engaging a rotating pipe tool extending through the adapter.

3,587,735
BOTTOM HOLE SHUT-IN TOOL
Arthur L. Owen, Houston, Tex., assignor to Electric Wireline Specialties, Inc., Alice, Tex.
Filed Aug. 29, 1969, Ser. No. 854,174
Int. Cl. E21b 33/12
U.S. Cl. 166—129 23 Claims

An elongate mandrel adapted to be suspended in a tubular well conduit by a wire line extends through an upper as-

sembly section which includes an internally slotted control sleeve secured to the upper end of a tubular mounting member. An insulated electrical conductor extends through the mandrel for monitoring or controlling electrical equipment secured below the mandrel and the mounting member carries radially expandable locking slips at its lower end. Leaf springs are secured externally of the mounting member to provide a friction drag against the surrounding well conduit which holds the member stationary while the mandrel is moved axially. A short knob extends radially from the mandrel and engages interconnected slot and stops formed in the control sleeve to selectively transmit axial movement of the mandrel to the upper assembly. A middle assembly surrounding the mandrel includes a centrally apertured conical slip spreader secured to a slotted tubular body which in turn is secured to a downwardly opening packer cup. A lower assembly carried over the mandrel includes a tubular valve sleeve which is sealed about the mandrel with a sliding O-ring seal. A conical cup spreader formed at the bottom of the lower assembly engages a backup body secured to the lower end of the mandrel. The middle and lower assembly are secured to the mandrel by shear pins which are sequentially severed during the setting and retrieval motions. Raising the



mandrel through the appropriate channel in the slotted pathway engages the slip spreader and slips to expand the slips and anchor the upper assembly. Subsequent raising shears the pin securing the upper assembly to the mandrel and engages the packer spreader and packer to expand the packer. The valve sleeve and packer cooperate to seal the well conduit. Moving the mandrel downwardly opens a bypass channel between the mandrel and the valve sleeve to equalize pressure across the set packer. Further downward movement of the mandrel permits the packer and slips to retract and release the tool from the well conduit. Continued lowering and subsequent raising of the mandrel engages the mandrel knob in a control sleeve stop and the entire tool assembly may be lifted from the conduit. The entire tool may be reversed in the conduit for use with higher pressures above the packer.

The lower assembly may also include a housing with spaced O-ring seals which surround and engage the mandrel to form a sealed chamber. The mandrel has different cross-sectional areas engaging the seals to balance axially directed forces exerted on the mandrel caused by the pressure differential existing across the set packer or to produce a net upwardly or downwardly directed force depending upon the relative dimensions of the various sealing areas.

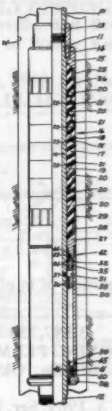
3,587,736

HYDRAULIC OPEN HOLE WELL PACKER

Cicero C. Brown, 5429 Sturbridge Drive, Houston, Tex.

Filed Apr. 9, 1970, Ser. No. 27,094
Int. Cl. E21b *33/12*
U.S. Cl. 166—187 **6 Claims**

A well packer for sealing-off a well bore, the seal element of the packer comprising a plurality of annular segments of deformable resilient material arranged in a stacked relation for radial expansion in response to endwise compression by fluid pressure-actuated means, the individual segments having specially shaped lip elements nestable in correspondingly



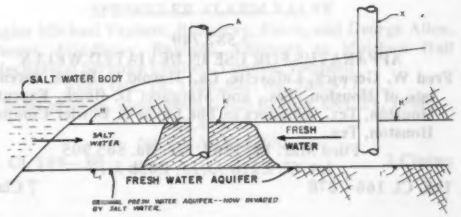
shaped recesses in the next adjacent segments and initially secured therein by means of a layer of adhesive material whereby to obviate accidental setting of the packer, the adhesive layer being releasable in response to the endwise compression for setting the packer.

3,587,737

PREVENTION OF SALT WATER ENCROACHMENT INTO FRESH WATER AQUIFERS

William C. Tosch, Parker, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Nov. 5, 1969, Ser. No. 874,169
Int. Cl. E21b *33/138*
U.S. Cl. 166—252 **7 Claims**



The advance of saline water into fresh water aquifers is inhibited by injecting into the aquifer, preferably in advance of the intruding salt water, a micellar solution comprising preferably a low equivalent weight petroleum sulfonate. Such a micellar solution, inter alia, becomes viscous upon contact with saline water and inhibits the further encroachment of additional saline water.

3,587,738

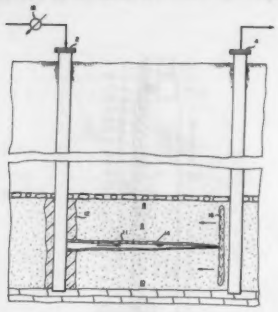
IN SITU COMBUSTION PRODUCTION METHOD

Harry W. Parker, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Oct. 27, 1969, Ser. No. 869,473
Int. Cl. E21b *43/24*
U.S. Cl. 166—259 **5 Claims**

A method for recovering hydrocarbons from a subterranean hydrocarbon-containing formation by counterflow in situ

combustion wherein the oxidant is passed through coated channels from the injection well to the combustion zone to



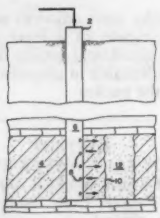
prevent spontaneous ignition of in place hydrocarbons at undesirable locations.

3,587,739

METHOD OF REMOVING PERMEABILITY BLOCKS

Harry W. Parker, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Nov. 3, 1969, Ser. No. 873,325
Int. Cl. E21b *43/24*
U.S. Cl. 166—261 **5 Claims**



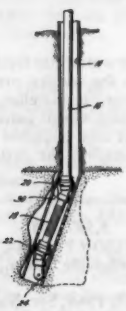
A method for removing viscous oil and tar permeability blocks from a formation and preconditioning said formation in the vicinity of an injection well for subsequent injection of oxygen for direct drive in situ combustion.

3,587,740

APPARATUS FOR USE IN DEVIATED WELLS

Fred W. Gerwick, Lafayette, La.; Harold C. Block, deceased, late of Houston, Tex., and Margaret D. Block, Executrix, Houston, Tex., assignors to The Layne & Bowler Company, Houston, Tex.

Filed Mar. 10, 1969, Ser. No. 805,905
Int. Cl. E21b *33/13*; **E03b** *3/18*
U.S. Cl. 166—278 **7 Claims**



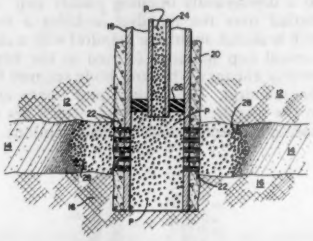
A well screen is disposed on a string of production conduit on a length of conduit at least one end of which is joined to adjacent conduit lengths by a ball joint connection. The ball joint connection has a maximum outside diameter significantly smaller than the diameter of the borehole wall, and a minimum inside diameter sufficient for maintaining an unobstructed central passageway through the connection. Centralizer springs are positioned around the ball joint connection.

3,587,741

HYDRAULIC FORMATION PACKING

Earl Martin Casey, Box 110, Powell, Wyo.

Filed Sept. 15, 1969, Ser. No. 857,673
Int. Cl. E21b *43/04*
U.S. Cl. 166—278 **6 Claims**



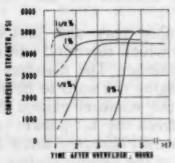
A well and method of completing same characterized by forcing porous pellets into a nonfracturable formation of unconsolidated, uncemented particles which are sufficiently mobile to be compacted outwardly from the well, thus forming an artificial volume between the well bore and a new envelope of compacted particles, the volume being filled with the pellets, replacing the original particles, and forming a permeable bed through which fluid may flow through the envelope and pellet bed to the well bore or casing in same. Since the area of the new envelope is considerably in excess of the envelope of the original uncompacted particles, increased fluid production is thus attained. Also, since the rate of movement of fluid across the unit area of the surrounding drainage envelope area of the pellet bed may thus be materially increased over the original drainage area of the particle bed immediately surrounding the well bore, the tendency of the formation particles to migrate through the bed is reduced, thus reducing tendency to sand or clog the casing or pumping apparatus contained in same.

3,587,742

CONSOLIDATION OF SHALLOW FORMATIONS WITH ACID MODIFIED EPOXY RESINOUS MATERIAL

Clifford V. Wittenwyler, Union, N.J., and Robert S. Forrest, Houston, Tex., assignors to Shell Oil Company, New York, N.Y.

Filed Sept. 8, 1969, Ser. No. 856,036
Int. Cl. E21b *33/138*
U.S. Cl. 166—295 **7 Claims**



A method of consolidating a shallow, low temperature unconsolidated earth formation in order to improve subsequent oil recovery by means of a fluid drive, comprising treating the formation with (1) a hydrocarbon preflush, (2) a resinous solution containing an epoxy resin forming material, an amine curing agent, an organic phosphate and/or silane coupling agent and as an accelerator a polar-substituted carboxylic acid, e.g., a hydroxy containing carboxylic acid, said

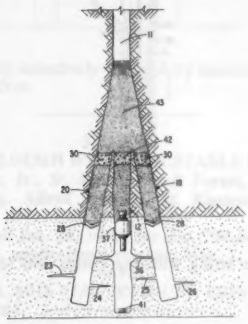
additive mixture being dispersed or dissolved in a polar-containing solvent and (3) an overflush comprising of a hydrocarbon liquid.

3,587,743

EXPLOSIVELY FRACTURING FORMATIONS IN WELLS

George C. Howard, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla.

Filed Mar. 17, 1970, Ser. No. 20,281
Int. Cl. E21b *43/26*
U.S. Cl. 166—299 8 Claims



In order to increase drainage from a porous but low permeability reservoir rock into wells, a plurality of wells are drilled into the reservoir rock. Hydraulic fracturing is employed to fracture between wells in the pay formation. A low fluid loss liquid explosive is placed in all wells. It also fills the fracture. Preferably each well is stemmed by placing a long mechanical obstruction immediately above the liquid explosive. Detonation of the explosive in the central well causes explosion of the liquid in the fracture, which in turn detonates the explosive in the surrounding wells. This creates a zone of large drainage area for production from the formation, or injection into it. Preferably the neighboring wells surrounding the central well are drilled by deviation or sidetracking from the central bore.

3,587,744

FRACTURING OF SUBSURFACE FORMATIONS

Arthur M. Spencer; Gordon R. Dysart, Dallas, and Arthur L. Anderson, Richardson, Tex., assignors to The Western Company of North America, Fort Worth, Tex.

Filed July 7, 1969, Ser. No. 839,264
Int. Cl. E21b *43/26*
U.S. Cl. 166—299 8 Claims

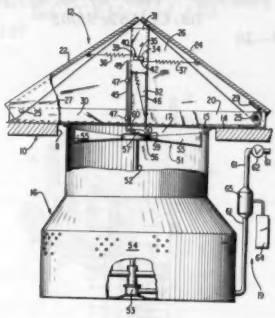
Subsurface formations are fractured by the process including containing within a bore hole which traverses the subsurface formation, a slurry which includes an inorganic oxidizer, and an explosive fuel fuel such as TNT; and detonating the slurry explosive to yield a multitude of fractures extending radially from the point of detonation, which fractures are opened sufficiently to allow the passage of formation fluid therethrough.

3,587,745

ROOF MOUNTED FOAM GENERATOR WITH AUTOMATICALLY OPENING VENTILATOR

Charles W. Perry, Belleville, and Benjamin Wendroff, Teaneck, N.J., assignors to Walter Kidde & Company, Inc., Belleville, N.J.

Filed Apr. 1, 1969, Ser. No. 812,235
Int. Cl. A62c *35/00*
U.S. Cl. 169—15 2 Claims



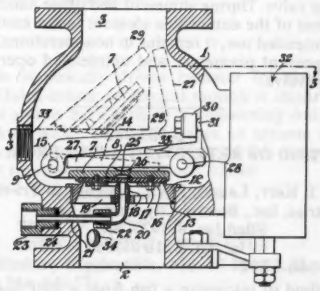
A water powered foam generator suspended from the roof of a building and having its air inlet aligned with an opening in the roof is interconnected with a ventilator which covers the opening and is provided with doors that automatically open when the generator starts to operate. The ventilator is provided with springs urging the doors to open, a latch holding the doors closed, and a device for releasing the latch. The foam generator has a water driven vertical shaft which carries a member that operates the latch release device when the shaft rotates in response to the flow of water to the generator.

3,587,746

SPRINKLER ALARM VALVE

Douglas Michael Venison, Billericay, Essex, and George Allen, Pinner, Middlesex, England, assignors to Matthew Hall Mechanical Services Limited, London, England

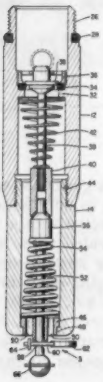
Filed Dec. 18, 1968, Ser. No. 784,577
Claims priority, application Great Britain, Oct. 21, 1968, 49,878/68
Int. Cl. A62c *37/06*
U.S. Cl. 169—19 2 Claims



An alarm valve mechanism for controlling the delivery of fluid to a sprinkler system and being optionally settable for

either a wet or a dry system, said valve incorporating a clack arranged in a valve opening, and an alarm port, wherein said valve opening and said alarm port are formed with concentric sealing faces arranged in the same place and a common sealing member is provided to close both said opening and said port. Said sealing member and said clack are also provided with means to prevent, in the wet state, unintentional operation of the alarm in the event of a change in the pressure differential on opposite sides of said clack.

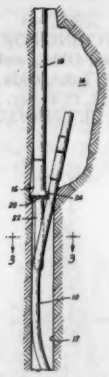
3,587,747
FIRE EXTINGUISHER WITH REMOVABLE FUSIBLE LINK
Max A. Romero, 5409 S. Huron Way, Littleton, Colo., and Conrad S. Mikulec, 214 E. Treehaven Road, Buffalo, N.Y.
Filed Mar. 7, 1969, Ser. No. 805,269
Int. Cl. A62c *35/02*
U.S. Cl. 169—26 **13 Claims**



Fire extinguisher of the type employing a container of pressurized extinguisher material characterized by a normally closed discharge valve which remains attached to the container and a detachable element including a spring retained in loaded condition by a fusible link and adapted to open the discharge valve upon melting of the link only when the detachable element is operatively associated with the discharge valve. During shipment and other handling prior to attachment of the detachable element to the container at the situs of intended use, it remains in nonoperational association to thus prevent premature and unintended operation of the discharge valve.

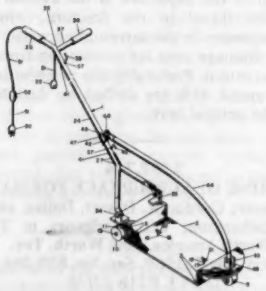
3,587,748
METHOD OF RETRIEVING A FISH FROM A WELL BORE
William I. Kerr, Laurel, Mich., assignor to Tri-state Oil Tool Industries, Inc., Bossier City, Parish, La.
Filed Jan. 8, 1970, Ser. No. 1,417
Int. Cl. E21b *29/00, 31/00*
U.S. Cl. 166—301 **4 Claims**

A method of retrieving a fish from a well bore where the upper end of the fish is outside the normal well bore and cannot be caught by the usual fishing tools wherein such method includes the steps of cutting a notch in the side of the uppermost portion of the fish within the normal well bore and thereafter locating a cutter on such notch to cut through the fish so that a retrieving tool engages the fish and retrieves the



same when the string with the cutter and retrieving tool is pulled.

3,587,749
LAWN EDGER ATTACHMENT FOR A POWER SAW
Gerald P. Sauer, 910 Chelton Parkway, Cherry Hill, N.J.
Filed Mar. 22, 1968, Ser. No. 715,318
Int. Cl. A01b *45/04*
U.S. Cl. 172—15 **1 Claim**

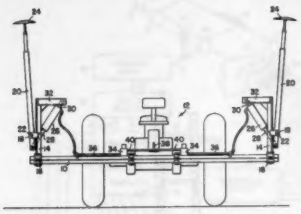


An electric power saw has its saw blade replaced with a two side ground cutter blade and is attached to and carried by a wheeled carrier. A shoe on the power saw is attached to a baseplate of the carrier and the shoe and cutter blade are adjustable relative to each other to adjust the blade cutting height. A pivotally mounted handle, by which the carrier may be pushed, carries a switch for stopping and starting the saw electric motor. The carrier baseplate is supported on three wheels for ease of turning and maneuvering.

3,587,750
ROW MARKER
John Isaac Cantral, and Robert Otto Taube, Moline, Ill., assignors to Deere & Company, Moline, Ill.
Filed Jan. 27, 1969, Ser. No. 793,984
Int. Cl. A01b *35/32;* **F15b** *13/06*
U.S. Cl. 172—130 **7 Claims**

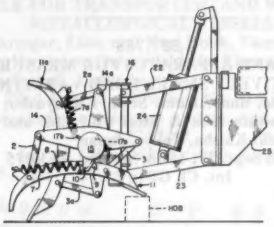
Row markers for agricultural implements in which the marker arms are pivotally mounted to the implement, are gravity urged downwardly to the working positions, and are raised by hydraulic cylinders. The cylinders are connected in parallel and are alternately connectable with a fluid source and reservoir provided on a propelling vehicle. A solenoid valve is associated with each cylinder and normally prevents

the flow of fluid from the cylinders, but provide free flow of fluid to and from the cylinders when activated so that the



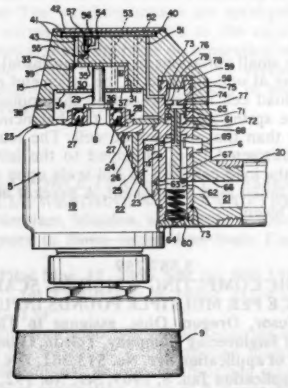
marker arms are selectively lowered by selectively activating the solenoid valves.

3,587,751
SNOWPLOUGH WITH ADJUSTABLE BLADE
Alfred Schmidt, Jr., St. Blasien/Black Forest, Germany, assignor to Ing. Alfred Schmidt, St. Blasien/Black Forest, Germany
Filed Jan. 28, 1969, Ser. No. 794,643
Claims priority, application Germany, Mar. 1, 1968, P 17 08 665.6
Int. Cl. A01b *61/00;* **E02f** *3/76;* **E01h** *5/06*
U.S. Cl. 172—264 **8 Claims**



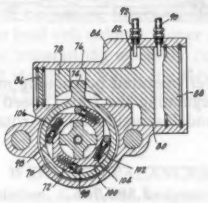
A snowplough includes a device which prevents injury to the plough blade when the plough blade encounters a solid obstacle by moving the blade upward and downward or by tilting the same about a horizontal axis.

3,587,752
FLUIDIC GOVERNOR FOR AIR TOOLS
Stanley K. Smith, Baltimore, Md., assignor to The Black and Decker Manufacturing Company, Towson, Md.
Filed June 2, 1969, Ser. No. 829,230
Int. Cl. B24b *23/00*
U.S. Cl. 173—12 **37 Claims**



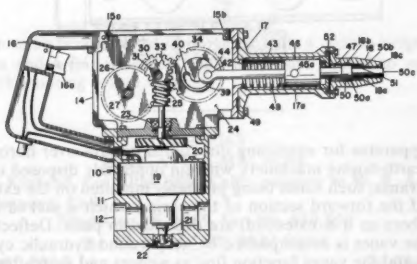
An overspeed governor for rotating air motors including speed sensing means for providing a signal corresponding to the speed of the motor, valve means located in the path of the air supply to the motor, and fluidic means responsive to the speed signal for controlling the operation of the valve. The system is preferably sealed from the inlet supply but exercises control over a portion of the inlet supply pressure which is used to actuate the valve. The valve is biased closed and motor speed above a selected level switches the control pressure away from the actuation means so that the valve closes.

3,587,753
ROCK DRILL WITH OVERRIDING CLUTCH
Jacob E. Feucht, Sidney, Ohio, assignor to Westinghouse Air Brake Company, Wilmerding, Pa.
Filed May 21, 1969, Ser. No. 826,516
Int. Cl. E21c *3/24, 3/30*
U.S. Cl. 173—107 **5 Claims**



A fluid actuated rock drill of the percussive type is provided with an overriding clutch adapted to be actuated by the operating fluid in timed relation with the percussive mechanism to rotate the drill steel.

3,587,754
POWER DRIVEN HAMMERS
Walter R. Laatsch, DePere, Wis., assignor to L. F. Garot, Green Bay, Wis., fractional part interest
Filed Nov. 24, 1969, Ser. No. 879,336
Int. Cl. B25d *11/00*
U.S. Cl. 173—117 **3 Claims**

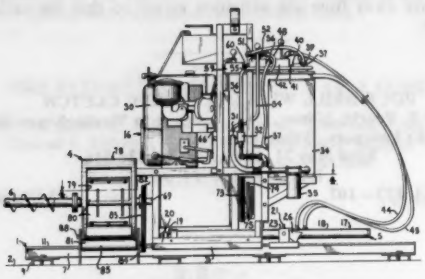


A portable electrically driven hammer for riveting and other uses. Quick-return reciprocal motion is imparted to a spring-biased piston by means of a connecting rod and attached crankpin which slidably engages an arcuate slot in a rotating gear. The quick-return motion of the piston is utilized to effect repeating, sharp hammer blows.

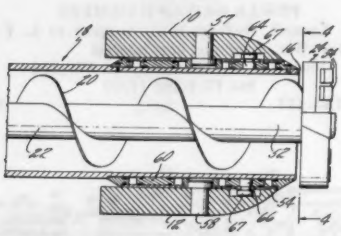
3,587,755
EARTH BORING APPARATUS
Emmet G. Slusher, Higginsville, Mo. (R.R. #2, Box 118 A, Lexington, Mo. 64037)
Filed Aug. 11, 1969, Ser. No. 849,051
Int. Cl. E21c *5/00*
U.S. Cl. 173—159 **10 Claims**

An earth boring apparatus for boring holes under roadways and the like and including a platform which is movable along

an elongated frame in response to power operated positioning means. An auger drive shaft is rotatably mounted on the platform and operatively connected to drive means for rotating the auger drive shaft. Control means are operatively connected to the power operated positioning means and to the drive means for regulating the travel speed of the platform along the frame and for regulating the rotary speed of the auger drive shaft.



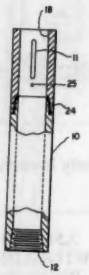
3,587,756
GEODYNAMIC WING
David E. Adkins; Ronald L. Legue, and Michael V. Widman, Columbus, Ohio, assignors to American Gas Association, Inc., New York, N.Y.
Filed Nov. 5, 1968, Ser. No. 773,483
Int. Cl. E21b *7/04*
U.S. Cl. 175—61 **10 Claims**



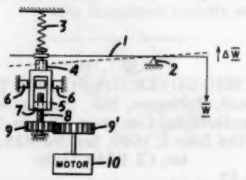
Apparatus for exercising directional control over horizontal earth-boring machinery wherein oppositely disposed control vanes, such vanes being pivotably mounted on the exterior of the forward section of the casing which is jacked into the bore as it is extended, are deflected in pairs. Deflection of the vanes is accomplished by wraparound hydraulic cylinders and the vanes function first as wedges and thereafter, as the casing and boring tool move forward, as control surfaces to guide the machinery back onto the desired straight-line path.

3,587,757
HYDRAULIC DRILLING TOOL
Bobby R. Herring, 1327 Clyde Drive, Marrero, La.
Filed Feb. 25, 1969, Ser. No. 802,099
Int. Cl. E21b *3/08*
U.S. Cl. 175—94 **1 Claim**

The present invention pertains to an improved apparatus for use with positive displacement mud motors employed in present day directional drilling operations. Downhole deviations are usually accomplished today by the use of these drilling machines in combination with a bent sub placed above the machine which thereby forces the drill bit to drill in the desired direction. The instant invention provides a hydraulic sub which is preferably positioned above the drill motor and bent sub whereby jamming of the drill bit is eliminated. The present hydraulic feed sub basically comprises a piston-and-cylinder assembly which is actuated by the drilling fluid that operates the mud motor.



3,587,758
METHOD AND APPARATUS FOR MEASURING A RELATIVELY SMALL LOAD VARIATION
Tomohiko Akuta, and Atsumi Seya, Kitakyushu, Japan, assignors to Yawata Iron & Steel Co., Ltd. and Mitsubishi Seiko Kabushiki Kaisha, Tokyo, Japan
Filed Sept. 27, 1968, Ser. No. 763,075
Int. Cl. G01g *23/14*
U.S. Cl. 177—1 **5 Claims**

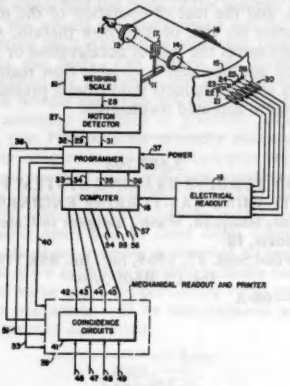


To measure small variations in a load an initial load is applied to a lever at one end and at the other end a balancing spring and a load cell are arranged on the opposite sides of the lever. The spring coefficient of the balancing spring is much greater than that of the load cell. The load-variation component subtracted from or added to the initial load is measured by the load cell with its full scale upon subtracting or adding the initial load component. A bracket may be used instead of the lever.

3,587,759
ELECTRONIC COMPUTING WEIGHING SCALE WITH PRICE PER MULTIPLE POUNDS INPUT
William C. Susor, Oregon, Ohio, assignor to The Reliance Electric and Engineering Company, Toledo, Ohio
Continuation of application Ser. No. 513,361, Dec. 13, 1965. This application Jan. 8, 1969, Ser. No. 792,203
Int. Cl. G01g *23/38*
U.S. Cl. 177—4 **12 Claims**

An electronic computing weighing scale having a computer

operable in fractional price mode, e.g., 3 pounds for $1.00, or whole number price mode, e.g., $1.00 per pound, and



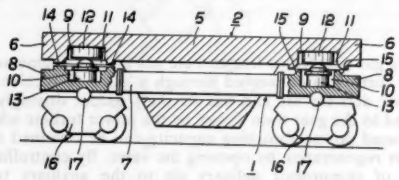
price entry means for the computer settable either to fractional or whole number price.

3,587,760

VEHICLE FOR TRANSPORTING AND WEIGHING METALLURGICAL VESSELS

Othmar Puhringer, Linz, and Karl Holik, Vienna, Austria, assignors to Vereinigte Osterreichische Eisen-und Stahlwerke Aktiengesellschaft, Lonz, Austria

Filed Apr. 15, 1969, Ser. No. 816,240
Claims priority, application Austria, Apr. 17, 1968, A3717/68
Int. Cl. G01g *19/04, 19/10, 23/02*
U.S. Cl. 177—141 **5 Claims**



The invention relates to a rail-supported transfer vehicle for metallurgical vessels which includes means for weighing the load supported thereon. According to the invention the vehicle comprises a double-frame construction, i.e. a lower frame supporting the traveling mechanism and an upper frame adapted to hold the load and normally resting on said lower frame. The weighing means are arranged in a cavity formed by corresponding recesses in the upper and lower vehicle frames and are operable on separation of said frames by extensible lifting means mounted in vertical alignment with said weighing means and preferably in axial alignment with the wheeled trucks of the vehicle.

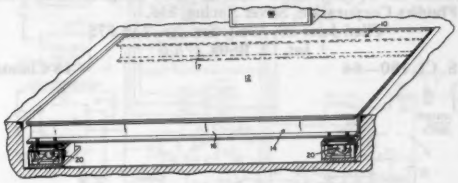
3,587,761

LOAD CELL FORCE TRANSMITTING ASSEMBLY FOR VEHICLE WEIGHING SCALES AND THE LIKE

Layton C. Merriam, Mendon, and Austin L. Davis, Brandon, Vt., assignors to Howe Richardson Scale Company, Rutland, Vt.

Filed Mar. 11, 1969, Ser. No. 806,176
Int. Cl. G01g *3/14, 19/02, 21/24*
U.S. Cl. 177—134 **7 Claims**

An assembly for supporting a load-receiving structure and transmitting the weight of a load applied thereto to a load cell. The assembly has an impact-absorbing resilient pad on which a layer of antifriction material is disposed to provide a surface which slidably supports the load-receiving structure for horizontal movement. The pad is fixed on the central portion of a flexure plate or diaphragm having only its opposite end regions so anchored to a stationary surface that the intermediate portions of the plate between each end region and the central region are flexed by the load transmitted to the pad. The central plate portion is thus vertically displaceable to engage and transmit loads to the load cell stress column



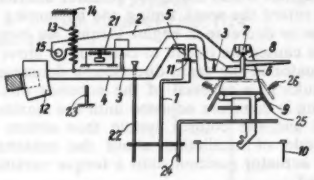
located vertically below the central portion. This flexure of the plate and the horizontal platform movement provides for the transmission of only those forces which substantially axially align with the load cell column. Cover plates on opposite sides of the force transmitting assembly cooperates with the flexure plate and stands on which the flexure plate end regions are anchored to provide an enclosure for the load cell.

3,587,762

WEIGHING BALANCES

Adolf Ast, Messstetten, Germany, assignor to August Sauter KG

Filed Oct. 22, 1968, Ser. No. 769,652
Claims priority, application Germany, Oct. 25, 1967, S112569
Int. Cl. G01g *21/16, 1/18*
U.S. Cl. 177—203 **10 Claims**



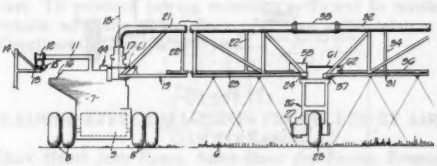
An analytical balance is provided with a coarse-weighing beam and a fine-weighing beam which are caused to move together during coarse weighing.

3,587,763

IRRIGATING MACHINE

Alan Kinkead, Los Altos Hills, Calif., assignor to W. R. Ames Company, Calif.

Filed Aug. 15, 1969, Ser. No. 850,550
Int. Cl. B60d *1/08;* **B62d** *59/04*
U.S. Cl. 180—14 **16 Claims**



An irrigating machine includes a main unit and one or more auxiliary units all adapted to travel on the ground and propelled by individual motors, the elongated units being pivoted together at their adjacent ends for movement about a common axis usually vertical, sometimes horizontal and sometimes both. The pivotal movement between one unit and the adjacent unit is utilized to actuate a control

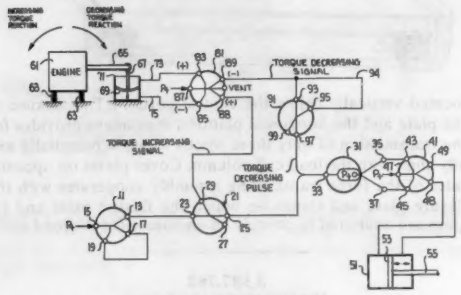
mechanism so that selected drive motors are varied in speed or are turned off from time to time in order to maintain the desired alignment or relative pivoted position of the adjacent units with respect to each other.

3,587,764

FLUIDIC ADAPTIVE SPARK ADVANCE SYSTEM

Romald E. Bowles, Silver Spring, Md., assignor to Bowles Fluidics Corporation, Silver Spring, Md.

Filed June 20, 1968, Ser. No. 738,575
Int. Cl. B60k *27/06*
U.S. Cl. 180—64 **16 Claims**



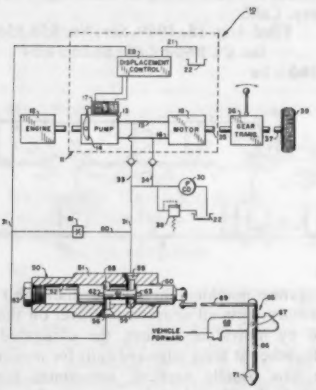
Spark timing in a spark ignition engine is controlled to provide maximum engine torque by utilizing a fluidic logic circuit in combination with an actuator for selectively advancing and retarding spark timing in response to fluid signals and a sensor for detecting increasing and decreasing engine torque. At any given engine speed the logic circuit seeks the actuator direction which produces increasing torque by providing signals which move the actuator alternately to advance and retard the spark timing and by sensing the resulting increase or decrease in engine torque. An increase in engine torque causes the circuit to continue to move the spark-timing actuator in the same direction; a decrease in engine torque results in a reversal of the actuator direction. The spark timing is therefore adjusted until the maximum torque is realized and the control system then enters a low-amplitude mode of oscillation about the maximum-torque-producing actuator position until a torque variation is once again sensed.

3,587,765

ACCELERATION CONTROL FOR HYDRAULIC TRANSMISSIONS

James W. McFarland, Hutchinson, Kans., and Wendell E. Miller, Warsaw, Ind., assignors to Cessna Aircraft Company, Wichita, Kans.

Filed Nov. 21, 1968, Ser. No. 777,638
Int. Cl. B60k *17/10*
U.S. Cl. 180—66 **9 Claims**



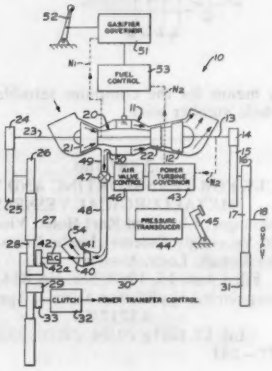
A control device for use with a vehicular hydrostatic drive which limits the rate of change of speed of hydrostatic transmission. A fluid pressure actuated mechanism is operatively connected to the transmission to change the speed of the transmission, and the rate of operation of the mechanism is dependent upon the rate of fluid flow thereto. An acceleration sensor measures the rate of acceleration or deceleration of the vehicle and operates a variable flow restrictor placed in a flow line which conducts fluid from a pressure source to the fluid pressure actuated mechanism.

3,587,766

AUXILIARY TURBINE BRAKING SYSTEM FOR FREE-TURBINE GAS-TURBINE ENGINES

Peter M. Slade, Issaquah, Wash., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sept. 17, 1969, Ser. No. 858,776
Int. Cl. B60k *3/04*
U.S. Cl. 180—66-A **10 Claims**



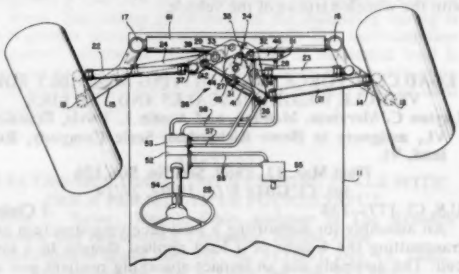
In a gas-coupled or free-turbine gas-turbine engine an auxiliary turbine is connected through a valve to receive compressor delivery air and has its shaft output drivingly connected to the gear train driven by the power turbine whereby increased power absorbing capacity can be obtained during power regeneration by opening the valve. By controlling the flow of compressor delivery air to the auxiliary turbine modulation of the power-absorbing capacity of the engine can be obtained.

3,587,767

STEEERING ASSEMBLY FOR A VEHICLE

Roger L. Gamaunt, Sunnyvale, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Dec. 19, 1968, Ser. No. 785,269
Int. Cl. B62d *5/06, 7/00*
U.S. Cl. 180—79.2R **6 Claims**



A steering assembly includes steerable wheels which are mounted to turn on wheel-supporting arms. As the wheels

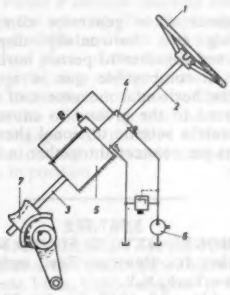
are turned, the supporting arms pivot outwardly to translate the wheels outwardly and to increase the clearance space between each wheel and the body of the vehicle. As the turn is completed, the wheels are straightened and the arms pivot inwardly to bring each wheel to a minimum clearance position—close to the body. The wheels are turned and are laterally translated by a Pitman-arm subassembly which is linked to both wheels and both wheel-supporting arms. The Pitman-arm assembly includes a pivotally mounted base member and two Pitman arms pivotally mounted thereon, which arms are coupled together through gear segments. The Pitman arms may spread apart and close together; and simultaneously the whole subassembly may pivot on the base member. A first hydraulic drive cylinder is coupled to spread the Pitman arms apart and to close them together; and a second hydraulic drive cylinder is coupled to pivot the base member. Both drive cylinders are hydraulically controlled by a main control valve and a proportioning valve such that the steering drive operations will be simultaneous and proportional with respect to each other.

3,587,768

HYDRAULIC AUXILIARY POWER STEERING MEANS FOR VEHICLES

Johannes Ortheil, Anrath, Allee Lo, Germany, assignor to Langen & Company, Dusseldorf, Germany

Filed July 24, 1969, Ser. No. 844,293
Claims priority, application Germany, Aug. 1, 1968, P 17 80 104.6
Int. Cl. B62d *5/10*
U.S. Cl. 180—79.2R **1 Claim**



A hydraulic auxiliary power steering means for vehicles in which a steering spindle constituted by two components movable by a small amount relative to each other is provided with a control valve which, for the purpose of generating an auxiliary force, due to the relative movement between the components allows a pressure medium to flow to or from the active surfaces of a piston which slides in a nonrotatable and fluidtight manner in a nonrotatable cylinder. The piston is provided in its interior with a screw thread particularly a recirculating ball thread which coacts with that component constituting the steering spindle which is remote from the steering wheel.

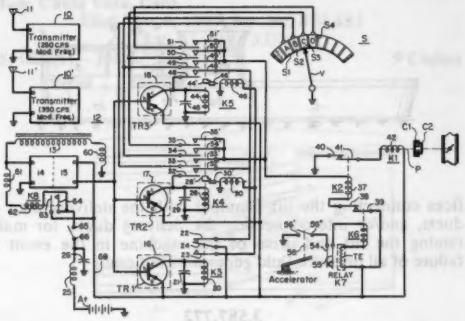
3,587,769

VEHICLE SPEED CONTROL SYSTEM

John G. Lotter, 7843 Elmgrove Drive, Elmwood Park, Ill.

Filed Feb. 17, 1969, Ser. No. 799,875
Int. Cl. B60k *31/00*
U.S. Cl. 180—98 **4 Claims**

An automatic control system for a motor vehicle having adjustable speed control apparatus comprises one or more radio frequency transmitters, the outputs of which are modulated by command signals of predetermined different frequencies individually identified with an assigned speed limit. A receiver carried by the vehicle includes a demodulator for detecting the command signals, a signal translating circuit for developing a control signal and an electromechanical device which engages the speed control apparatus upon receipt of a command signal to restrict the speed of the vehicle to the speed limit assigned to the command signal. The output of the signal-translating circuit is coupled to the electromechanical device by means responsive to the speed of the vehicle and, for emergency purposes, operator controllable means are provided to permit disengaging the electromechanical device from the speed control apparatus for a predeterminable period.

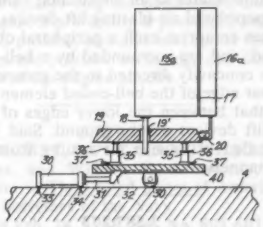


3,587,770

UNDESIRABLE YAWING MOVEMENT CORRECTING MEANS FOR GAS-CUSHION VEHICLES

John Walter Flower, Mangotsfield, Bristol, England, assignor to National Research Development Corporation, London, England

Filed Mar. 13, 1969, Ser. No. 806,995
Claims priority, application Great Britain, Mar. 18, 1968, 12716/68
Int. Cl. B60v *1/00, 1/14*
U.S. Cl. 180—117 **14 Claims**



Automatically to cancel out yawing moments generated by relative winds on a gas-cushion vehicle, a vertical fin is mounted thereon for rotation by wind forces about an axis displaced from the vehicle's center of gravity. The incidence of the fin is adjusted as it rotates to generate the predetermined yawing moments required for this purpose, by a tab, the setting of which in relation to the fin is governed by a cam. To produce yawing moments sufficient to render the vehicle neutrally stable when operating in all relative wind directions two fins are provided.

3,587,771

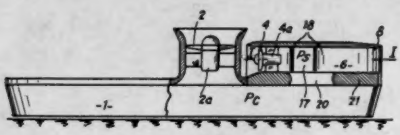
GROUND-EFFECT MACHINES PROPELLED BY AIR OR GAS STREAMS

Marc Henri Jean Faure, Saint-Maur des Fosses, France, assignor to Societe D'Etudes Et De Developpement Des Aeroglisseurs Marins Terrestres Et Amphibies S.E.D.A.M., Paris, France

Filed July 14, 1969, Ser. No. 841,291
Claims priority, application France, July 23, 1968, 160,274
Int. Cl. B60v *1/14*
U.S. Cl. 180—120 **9 Claims**

In a ground effect machine having a central lift chamber for one or more pressure-fluid cushions, supplied with pres-

sure fluid by a pressure-fluid generator, and one or more further pressure-fluid generators each having a delivery duct having an adjustable cross section ejection nozzle for driving the machine, the improvement comprising one or more ori-

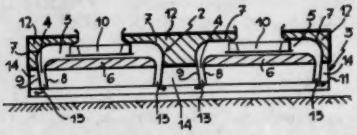


fices connecting the lift chamber with the delivery duct or ducts, and/or interconnecting the delivery ducts, for maintaining the lift and drive of the machine in the event of failure of all pressure-fluid generators but one.

3,587,772
AIR-CUSHION VEHICLE

Andre Louis Jaumotte, Avenue F. D. Roosevelt, 50, Brussels, Belgium

Filed Oct. 28, 1968, Ser. No. 771,097
Claims priority, application Belgium, Nov. 17, 1967, 51,009
Int. Cl. B60v *1/00*
U.S. Cl. 180—121 **2 Claims**

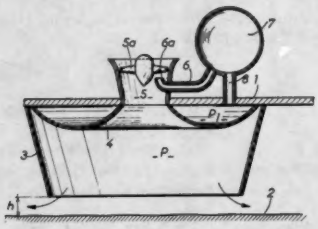


The invention relates to an air-cushion vehicle comprising at least two peripheral air-blasting lift devices. Said air-blasting lift devices comprise each a peripheral channel directed to the ground, and are surrounded by a bell-ended element which has its concavity directed to the ground. The distance from the lower edge of the bell-ended element to the ground is less than that between the lower edges of the peripheral air-blasting lift devices on the ground. Said bell-ended element is intended to receive air issuing from the aforesaid peripheral channels.

3,587,773
FACILITIES FOR CONFINING THE FLUID CUSHIONS OF A GROUND-EFFECT MACHINE

Jean Henri Bertin, Neuilly-sur-Seine, and Paul Francois Guienne, Paris, France, assignors to Bertin & Cie, Paris, France

Filed Nov. 14, 1968, Ser. No. 775,697
Claims priority, application France, Nov. 17, 1967, 128,758
Int. Cl. B60v *1/16*
U.S. Cl. 180—124 **1 Claim**

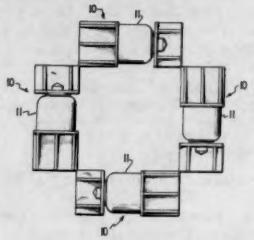


A ground effect vehicle comprises a cushion of plenum-chamber type, and a deformable enclosure is disposed inside the cushion. The enclosure is supplied with pressure fluid so that random variations in cushion pressure are absorbed by deformation of the deformable enclosure.

3,587,774
SEISMIC SHEAR WAVE IMPULSE GENERATOR

John Bemrose, deceased; Elsie Hildegard Bemrose, Administratrix, and Lauren G. Kilmer, Tulsa, Okla., said Kilmer assignor to Atlantic Richfield Company, New York, N.Y.

Filed Aug. 26, 1968, Ser. No. 755,465
Int. Cl. G01v *1/14*
U.S. Cl. 181—0.5 **12 Claims**

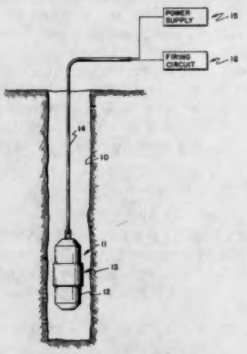


A seismic shear wave generator comprising a closed chamber having two horizontally displaced members resiliently fastened together to permit horizontal movement therebetween. A combustible gas is ignited within the chamber and the horizontal movement of one of the members is transferred to the ground to cause a seismic shear wave. To generate a seismic torsional shear wave, three or more generators are connected together in a ring and ignited simultaneously.

3,587,775
HYDROGEN-OXYGEN SOUND SOURCE

William E. Baier, Jr., Houston, Tex., assignor to Shell Oil Company, New York, N.Y.

Filed May 19, 1969, Ser. No. 825,594
Int. Cl. G01v *1/00*
U.S. Cl. 181—.5 **3 Claims**



A repetitive sound source for use in seismic exploration wherein a nonexplosive liquid is introduced into a closed container having at least a portion of its wall formed of a

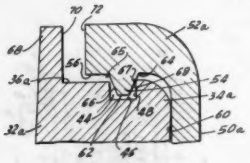
flexible material, disassociating the liquid to constituents which are explosively recombinable to reform the nonexplosive liquid, with the process being repeatable to produce additional seismic waves.

3,587,776

DIAPHRAGM MOUNTING FOR STETHOSCOPE CHEST PIECE

Robert M. Haiken, Union, N.J., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

Division of Ser. No. 691,622, Dec. 18, 1967, Pat. No. 3,470,975.
Filed Apr. 23, 1969, Ser. No. 840,881
Int. Cl. A61b 7/02
U.S. Cl. 181—24 4 Claims



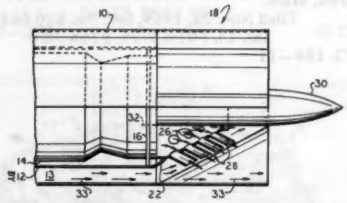
A stethoscope chest piece comprising a microphone housing having surfaces defining an opening into the interior thereof disposed within a circular sidewall and a diaphragm adapted to fit over the opening. The diaphragm consists of a membrane disposed within an elastic ring substantially transverse to the principal plane of the membrane and having inwardly projecting surfaces to engage portions of the sidewall. The diaphragm is thus adapted to be stretched over the bottom of the edge of the sidewall so that the inwardly projecting surfaces may engage with portions of the sidewall. The bottom edge of the sidewall thereafter cooperates in retaining the diaphragm in position.

3,587,777

TURBOFAN PROPULSION APPARATUS WITH SILENCER AND OPERATING METHOD

Peter H. Ellis, Chula Vista, Calif., assignor to Rohr Corporation, San Diego, Calif.

Filed Oct. 23, 1969, Ser. No. 868,875
Int. Cl. B64d 33/06
U.S. Cl. 181—33HC 10 Claims



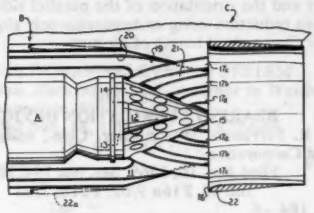
Lobed nozzle is attached to aft end of housing spaced around turbofan engine, fan air of the latter flowing through gap between housing and engine casing and then through lobe passages of said nozzle. Hollow, frustoconical inner member is disposed within the nozzle and attached at its base to aft end of engine casing. Pipes are mounted on outer side of inner member in rows extending axially thereof and respectively radially aligned with lobe passages, the pipes communicating with interior of inner member so that engine exhaust gas is discharged therethrough into said lobe passages, where it mixes with fan air. Slipstream air flows between nozzle lobes and then between streams of combined exhaust gas and fan air issuing from the lobe passages.

3,587,778

SOUND SUPPRESSION NOZZLE STRUCTURE FOR FAN-JET AIRCRAFT ENGINE

Peter H. Ellis, Chula Vista, Calif., assignor to Rohr Corporation, Chula Vista, Calif.

Filed Nov. 6, 1969, Ser. No. 874,455
Int. Cl. B64d 33/06
U.S. Cl. 181—33HC 9 Claims



A turbofan jet aircraft engine has a usual tail cone mounted coaxially on the aft rotor bearing housing. A conical housing is mounted coaxially on, and is sealed to the downstream end of the engine exhaust tube to form an exhaust gas plenum chamber between said conical housing and the engine tail cone. The apex of said housing is open to form a central exhaust nozzle, and a plurality of other exhaust nozzles extend radially from the conical housing and extend downstream to terminate in a plurality of concentric, circular rows about the apex nozzle.

A tailpipe is sealed coextensively to the downstream end of the outer wall of the usual annular fan air duct of the engine to enclose an annular space between the conical housing and the tailpipe, through which space extend the curved exhaust nozzles. The downstream ends of the outermost row of nozzles extend outwardly through openings provided therefor in the tailpipe.

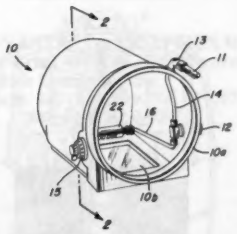
A retractable ejector ring for deployment during landing approach and takeoff preferably is provided, and is movable from a deployed position just downstream of the nozzle exit plane to a retracted position enclosing, and flush with, the downstream end of the engine nacelle.

3,587,779

DIVING HELMET, INPUT AIR NOISE SILENCER

John A. Beagles, and William H. Armstrong, San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy

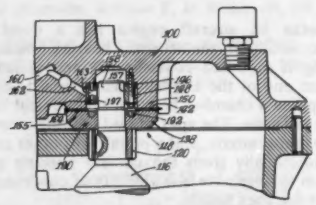
Filed Feb. 24, 1969, Ser. No. 801,601
Int. Cl. F01n 1/10, 7/12
U.S. Cl. 181—36 3 Claims



A compact apparatus for reducing gas or air flow noise produced as a gas passes from an external hose to the interior of a diving helmet is provided to minimize the possibility of injury to a diver's hearing and to enable more reliable communications with the surface. The apparatus includes a metallic tube having a plurality of correspondingly oriented parallel slots being attached to a coupler unit joining the apparatus to an external hose. Gas flowing through the hose passes through a first sintered metal wall, into a diffusion

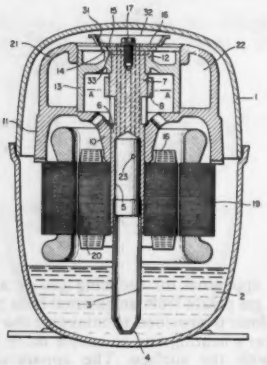
chamber, through another sintered metal wall, and out through the slots. The gas flow velocity is thusly reduced and the gas is passed to the interior of the helmet without the noise usually attendant such a transfer. The slotted tube is oriented to direct the gas flow angularly onto a faceplate to prevent the possibility of a diver's fogging the faceplate and further serves to keep the gas flow from directly impinging on an internal wall of the helmet to prevent air flow noise at this point. The dispersion of air flow through the sintered metal filter wall taken with the mixing action in the diffusion chamber and the orientation of the parallel slots ensures gas flow noise reduction using an apparatus only slightly larger in diameter than a short length of air hose.

3,587,780
BEARING LUBRICATION DEVICE
Harold R. Perriman, Westminster, Colo., assignor to Sundstrand Corporation
Filed Jan. 10, 1969, Ser. No. 790,282
Int. Cl. F16n 9/02; F01m 7/00
U.S. Cl. 184—6 **8 Claims**



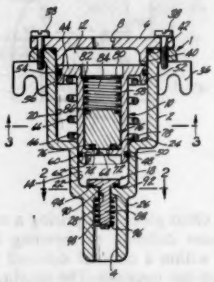
An auxiliary lubrication device for an axial thrust bearing assembly wherein a shaft thrust bearing is supplied lubricating oil from a lubrication pump including a thrust runner rotatable with the shaft with a bearing surface on one end thereof engaging a relatively stationary bearing surface and a reservoir either within the shaft itself or the rotating runner so disposed relative to the bearing surfaces that upon shaft startup lubricating fluid is temporarily supplied by centrifugal force pumping the fluid from the reservoir to the bearing surfaces.

3,587,781
ENCASED MOTOR COMPRESSOR
Hans Ulrik Leffers, and Bendt Wegge Romer, Sonderborg, Denmark, assignors to Danfoss A/S, Nordborg, Denmark
Filed June 16, 1969, Ser. No. 833,324
Claims priority, application Germany, June 19, 1968, P 17 51 558.1
Int. Cl. F01m 1/00
U.S. Cl. 184—6.16 **5 Claims**



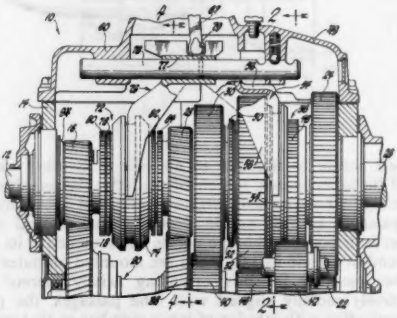
The invention relates to a lubricating system for a motor-compressor assembly of the type used for small refrigerating machines. The assembly has a vertical shaft arrangement with a centrifuging disc attached to the top of the shaft for flinging lubricating oil to the internal wall of the casing by centrifugal force. The shaft has a shoulder or flange which forms a part of an axial thrust bearing arrangement and the centrifuging disc has outwardly inclined wall means which extends from a level below to a level above the shoulder of the shaft.

3,587,782
AUTOMATIC FLUID INJECTOR
Lowell L. Russell, and Donald E. Bender, Herrin, Ill., assignors to Olin Mathieson Chemical Corporation
Filed Mar. 7, 1969, Ser. No. 805,325
Int. Cl. F16n 23/00
U.S. Cl. 184—7 **9 Claims**



A fluid injector including a housing having a piston therein dividing the interior of the housing into first and second chambers. The housing includes a first port in connection with the first chamber and a second port adapted to communicate with the second chamber. A valve is included for providing communication between the two chambers as the piston moves from its first normal position to its second driven position. Additional valve means are provided in the housing between the second port and the second chamber to provide communication therebetween when the piston moves from its driven position to its first normal position.

3,587,783
POWER TRANSMISSION AND TRANSMISSION-LUBRICATING SYSTEM
Leslie K. Walters, Warren, and Lee E. Hartman, Mount Clemens, Mich., assignors to General Motors Corporation, Detroit, Mich.
Filed Nov. 28, 1969, Ser. No. 880,664
Int. Cl. F01m 9/06; F16n 7/26
U.S. Cl. 184—11 **8 Claims**



Synchronized transmission having a first-second shifter fork with a lubricant-directing wall on its inner surface which

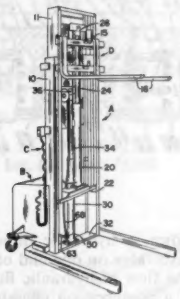
cooperates with a reverse gear mounted on the main shaft to form a pump for pumping transmission lubricating oil to the first gear area when the reverse gear is rotating. There is also a three-four shifter fork having lubricant-directing walls on its inner surface which direct lubricating oil coming off of the second and third speed gears and the countershaft gear onto the main shaft to lubricate the main shaft, and other transmission components.

3,587,784

TELESCOPIC LOAD BOOSTER

Raymond Carl Tait, Cleveland, Ohio, assignor to Hunter Manufacturing Company, Cleveland, Ohio

Filed Sept. 26, 1968, Ser. No. 762,678
Int. Cl. B66f *9/22*
U.S. Cl. 187—9 **6 Claims**



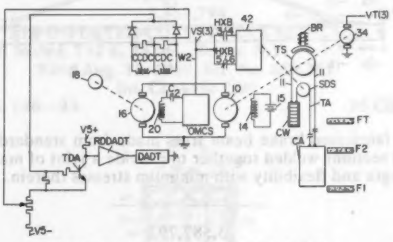
A hydraulically operated, telescopic forklift having a manifold in the hydraulic circuit interconnecting the pump, the cylinder for actuating the lift carriage and the cylinder for actuating the telescopic mast. The manifold includes a flow-restricting orifice leading to the mast cylinder and this orifice establishes a pressure differential between the pressures at which the two cylinders are actuated thereby achieving a controlled sequential operation both in lifting and lowering a load.

3,587,785

ELEVATOR CONTROL SYSTEM SAFETY ARRANGEMENT

Otto Albert Krauer, Tuckahoe, and Sheldon Edwin Kornbluth, Brooklyn, N.Y., assignors to Otis Elevator Company, New York, N.Y.

Filed Mar. 4, 1969, Ser. No. 804,242
Int. Cl. B66b *5/02*
U.S. Cl. 187—29R **23 Claims**



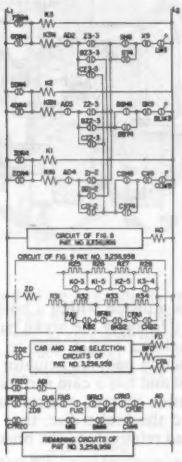
A safety arrangement for an elevator control system which provides safe operation while the elevator car is located at a landing with its doors open. A relatively large zone extending on both sides of each landing is established so that the elevator car and hoistway doors may start to open while the car is leveling into registry with any landing at which it is stopping. This permits the doors to be open a substantial amount by the time the car stops at the landing. A smaller zone extending on both sides of each landing is also established so that upon entering this zone the car is thereafter restricted in its leveling operation to this smaller zone. Failure of the car originally to enter the smaller zone or after entry to remain therein as long as its doors are open results in the car being prevented from subsequently making a trip to another landing. In addition to safeguarding against this and other misoperations of the elevator car and its control equipment this safety arrangement also monitors its own operation to protect against the safety equipment failing and producing an unsafe condition.

3,587,786

ZONE DEMAND ELEVATOR SYSTEM

Henry C. Savino, Hackensack, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 18, 1969, Ser. No. 877,645
Int. Cl. B66b *1/18*
U.S. Cl. 187—29 **9 Claims**



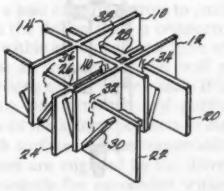
An elevator system in which available cars are assigned to proceed to zones of floors selected in accordance with an effective pattern of zones requiring service and the pattern of cars already serving corridor calls is improved by altering the effective pattern of zones requiring service when all of the zones having unanswered corridor calls therein have been provided for and an additional car becomes available so that the additional available car can be assigned to assist in serving corridor calls.

3,587,787

SHEAR ACTION ENERGY ABSORPTION MATERIAL

John W. Rich, and Grant W. Walker, Sacramento, Calif., assignors to John Rich Enterprises, Inc.

Filed Sept. 28, 1967, Ser. No. 671,472
Int. Cl. F16f *7/12*
U.S. Cl. 188—1 **10 Claims**



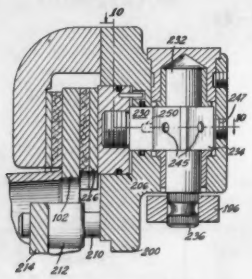
An energy-absorbing material comprising a pair of lattice constructions made of sheet members overlying each other

such that the edges of the sheet members engage each other upon impact and when crushed, cut and distort each other, thereby absorbing the impact energy, and a membrane for separating the lattice constructions is disclosed.

3,587,788
AUTOMATICALLY OPERABLE BRAKE APPARATUS FOR TRAILER VEHICLES

John Myers Beach; Edgar Crain Oglesbee; Arthur Roger White; George Stephen Ziegler, and Harry Hamilton Cecil, Dayton, Ohio, assignors to to said Beach

Division of Ser. No. 636,231, Apr. 7, 1967, Pat. No. 3,404,757.
Continuation of Ser. No. 416,996, Dec. 9, 1964, abandoned.
This application Aug. 7, 1968, Ser. No. 750,890
Int. Cl. F16d 65/44
U.S. Cl. 188—71.7 2 Claims



A disc brake has a piston within a housing and the piston engages a brake pad to apply the brake pad against the brake disc. The piston includes a stud with an end portion which also engages the friction pad. An actuator is located adjacent the head of the stud and has a cam surface engageable by the stud and upon rotation thereof, the stud and attached piston are adjusted toward the brake disc, thus adjusting the position of the brake pad relatively to the brake disc.

3,587,789
HYDROPNEUMATIC SINGLE-CYLINDER SHOCK ABSORBER

Friedrich Keilholz, Ennepetal-Voerde; Erwin Hausmann, Wuppertal-Elberfeld, and Erwin Jentsch, Ennepetal-Milspe, Germany, assignors to August Bilstein, Ennepetal-Altenvoerde, Germany

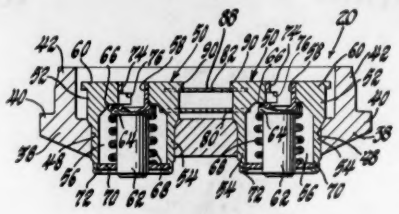
Filed Feb. 16, 1969, Ser. No. 802,591
Claims priority, application Germany, Feb. 28, 1968, P 16 50 938.9
Int. Cl. F16f 9/40
U.S. Cl. 188—100 7 Claims

A hydropneumatic single-cylinder shock absorber comprises a working cylinder partially filled with damping liquid and having pressurized gas above the liquid, and a perforated flexible membrane fixedly mounted in the cylinder as a damping element. The membrane adapts its shape to absorb liquid movements and prevent disturbance of the liquid/gas interface and is perforated to permit only one-way passage of the gas therethrough.

3,587,790
CYLINDER END ASSEMBLY FOR SHOCK ABSORBER

Harold E. Schultze, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 16, 1969, Ser. No. 825,336
Int. Cl. F16f 9/34
U.S. Cl. 188—100 1 Claim

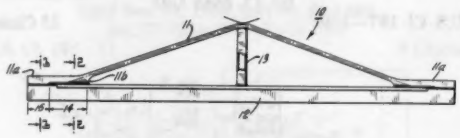


In preferred form, a hydraulic direct acting shock absorber having a base valve on one end of a pressure cylinder tube to regulate the flow of hydraulic fluid between a reservoir chamber and a compression chamber. Dual inlet ports and an overlying inlet reed valve and inlet leaf spring cooperate to regulate fluid flow from reservoir chamber to the compression chamber. A pair of compression valves supported in the base valve regulate fluid flow from the compression chamber to the reservoir chamber. Additionally, a peripheral flange on the compression valves are adapted to bias the inlet leaf spring against the inlet reed valve.

3,587,791
FABRICATED BRAKE BEAM TRUSS AND METHOD OF MAKING SAME

Frank Kenneth Veasman, Hamburg, N.Y., assignor to Buffalo Brake Beam Company

Filed Jan. 16, 1969, Ser. No. 791,607
Int. Cl. B61h 13/36
U.S. Cl. 188—225.6 14 Claims



A fabricated brake beam truss made from standard rolled steel sections welded together to provide a joint of maximum strength and flexibility with minimum stresses therein.

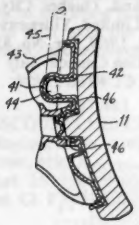
3,587,792
RAILWAY BRAKE STRUCTURE

Irvin J. Spaeth, Chicago, Ill., assignor to Evans Products Company, Plymouth, Mich.

Filed Jan. 21, 1969, Ser. No. 792,245
Int. Cl. B60l 7/12
U.S. Cl. 188—243 10 Claims

A railway brake structure including brakehead and a liner, preferably renewable, between the head and the friction shoe applied to the truck wheel. The liner may be contoured for application to a brakehead having a swing hanger support

from the truck frame or it may be contoured for a brakehead or beam having a sliding support on the truck frame.



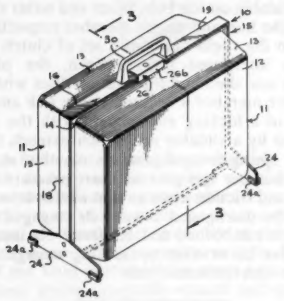
Preferably the liner will be of harder metal than the head or the shoe to better resist wear and more accurately position the shoe.

3,587,793

PAN CARRIER ASSEMBLY FOR FABRIC SAMPLES

Geoffrey E. Grieb, New York, N.Y., and Danforth Cardozo, Jr., Weston, Conn., assignors to Concord Fabrics, Inc., New York, N.Y.

Filed Aug. 26, 1969, Ser. No. 853,074
Int. Cl. A45c *11/00*
U.S. Cl. 190—16 **12 Claims**



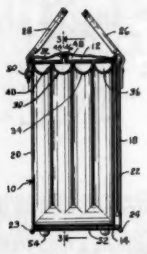
A pan carrier assembly for storing and transporting fabric samples and the like, including plural pans forming open receptacles for containing the samples and having a flange rim about the pan opening, and a carrier frame for supporting pairs of the pans in aligned confronting relation. The carrier frame has two oppositely opening wells into which the flange rims nest, and retaining formations for releasably holding the pans in assembled relation on the carrier frame.

3,587,794

AIR-INFLATED COLLAPSIBLE SUITCASE

Howard Mattel, 732 E. 242 St., Bronx, N.Y.

Filed Aug. 15, 1969, Ser. No. 850,361
Int. Cl. A45c *7/00*
U.S. Cl. 190—43 **10 Claims**



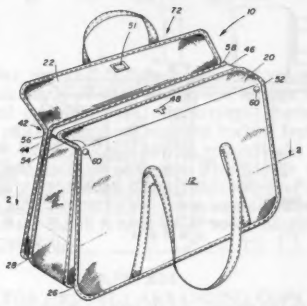
A generally rectangular suitcase has flexible top, side and end walls and a rigid bottom wall. The top and end walls are lined with tubular air-inflatable pockets. When the pockets are inflated the suitcase is self-supporting and stands upright. When the pockets are deflated the suitcase collapses on the bottom wall to form a flat, compact package. A slide fastener closure is provided at one sidewall. The sidewalls may be lined with thermal insulative material.

3,587,795

EXPANDABLE TOTE BAG

Morris J. Berry, and Louis Wells, Brooklyn, N.Y., assignors to Fashioncraft-Excello, Brooklyn, N.Y.

Filed Mar. 17, 1969, Ser. No. 807,644
Int. Cl. A45c *7/00*
U.S. Cl. 190—44 **10 Claims**



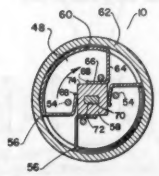
A tote bag adapted to be expandable comprising a pair of opposing front and rear walls and a pair of opposing sides, the bag being bottomed at one end thereof and openable at the other end thereof, each of said front and rear walls being associated with means for increasing the lateral dimension of said bag.

3,587,796

SELF-LOCKING TRANSMISSION MECHANISM

Dieter K. Nestvogel, Dineville, N.C., assignor to Duff-Norton Company, Inc., Charlotte, N.C.

Filed Sept. 15, 1969, Ser. No. 857,789
Int. Cl. F16d *67/00*
U.S. Cl. 192—8 **26 Claims**



A self-locking transmission mechanism for transmitting rotation of a drive shaft into rotation of a driven shaft through the use of drive studs connected to the drive shaft and acting through a pair of spring strips to rotate a transmission block to which the driven shaft is connected. The spring strips are disposed within a housing and have arcuate central portions disposed at an interior annular wall portion of the housing, spacer portions extending inwardly from the ends of the arcuate portions, and inturned end portions extending from the inner ends of the spacer portions to outer edges that are engageable with surfaces of the transmission block. The inturned end portions are engaged by the drive studs to bias the spring strips inwardly for movement without significant drag during drive transmitting rotation of the drive shaft, and are engaged by the transmission block to bias the spring strips outwardly and thereby impose a self-locking drag against the housing wall portion upon attempted rotation of

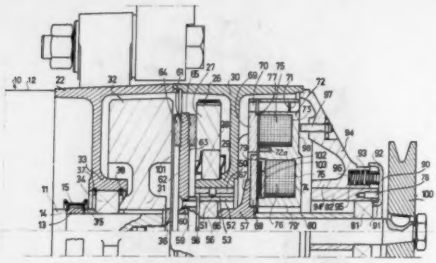
the driven shaft independent of rotation of the drive shaft. Self-locking is also positively obtained by jamming of the spacer portions between the housing wall portion and the transmission block upon attempted independent rotation of the driven shaft.

3,587,797

DUAL SPEED CLUTCHES WITH BRAKE

Laszlo Szekely, Athis-Mons; Claude Pigache, Courbevoie, and Michel Lafaye, Villebon-sur-Yvette, France, assignors to Engins Matra, Paris, France

Filed May 14, 1969, Ser. No. 824,454
Claims priority, application France, May 24, 1968, 152,941
Int. Cl. F16d *67/06*
U.S. Cl. 192—18 **9 Claims**



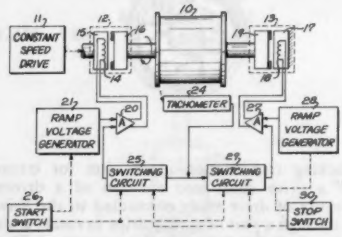
A device for driving and stopping a machine, more particularly a sewing machine. Between an electric driving motor and an output pulley or the like connected to the machine, there is provided a speed-reducing train and an electromagnetic-clutching and -braking device. The latter comprises two coaxial coils, one of which controls the clutching by causing, upon excitation, the movement of an assembly integral with a clutch-coupling member and the other one of which controls the braking by application of a friction packing housed in a support of said electromagnetic device against a plate integral with the movable assembly.

3,587,798

TIME AND SPEED MODULATED CLUTCH AND BRAKE

Ralph H. Schuman, Cleveland, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed Sept. 18, 1968, Ser. No. 760,577
Int. Cl. F16d *67/06*
U.S. Cl. 192—12 **3 Claims**



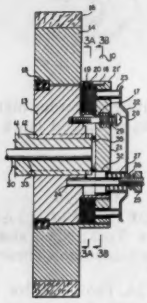
Drive system for a rotatable, variable inertia load comprising a constant speed input drive, a variable-torque, electrically operated friction clutch for connecting the input drive to the load, and a variable-torque, electrically operated friction brake for the load. When starting the load, a first ramp generator produces an increasing ramp voltage which is compared to a load velocity signal to provide an error signal for energizing the clutch. When stopping the load, a second ramp generator produces a decreasing ramp voltage which is compared to a load velocity signal to provide an error signal for energizing the brake.

3,587,799

FRICTIONAL AND POSITIVE PROGRESSIVE ENGAGEMENT CLUTCH

Jean Thomas Chamberland, Quebec City, Quebec, Canada, assignor to Mecanada Limited, Villeneuve, Canada

Filed Sept. 3, 1969, Ser. No. 854,915
Claims priority, application Canada, July 10, 1969, 056,717
Int. Cl. F16d *23/04*
U.S. Cl. 192—53 **6 Claims**



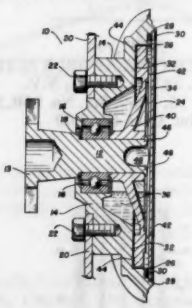
A drive shaft has a hub secured thereto and a driven member is rotatable on the hub. Inner and outer clutch shells project from the hub and driven member respectively, and a space between the shells contains a set of clutch plates with friction discs interposed therebetween, the plates being rotatable with one shell and the friction discs with the other. A positive drive member is secured to the hub and is slidable into and out of a locking engagement with the outer shell, being actuated by a slidable rod which extends through the drive shaft. A spring-pressed pressure member at the outside of the drive member has pins to exert pressure against the clutch plates and friction discs so that as the drive member is moved from its disengaged toward its engaged position, a friction drive is established and progressively increased until a positive drive takes over by locking engagement of the drive member with the outer shell.

3,587,800

CLUTCH FOR AN AUTOMOBILE FAN

Bobby D. Crawford, Arlington, Tex., assignor to Fan Clutch Inc., Dallas, Tex.

Filed Dec. 31, 1968, Ser. No. 788,291
Int. Cl. F16d *35/00;* **F16b** *17/00*
U.S. Cl. 192—58 **8 Claims**



The disclosure is directed to a fluid drive coupling for use with the cooling fan of an automobile. A housing having opposed interior faces defining a fluid-retaining chamber is connected to the fan of an automobile. A rotatable drive plate is disposed within the chamber, with fluid being provided within the chamber for fluid coupling the drive plate to the

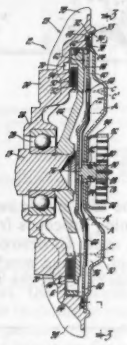
opposed interior faces of the chamber. The drive plate has a central opening therethrough, with opposed beveled surfaces defined about the edges of the central opening. A shaft is rotatably mounted within the housing and extends through the circular opening in the drive plate. The end of the shaft has edges which are bent over the beveled surfaces of the drive plate to provide a rigid connection with the drive plate.

3,587,801

VISCOUS FLUID CLUTCH

Robert J. Riner, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 25, 1969, Ser. No. 860,995
Int. Cl. F16d *35/00, 43/25*
U.S. Cl. 192—58 **11 Claims**



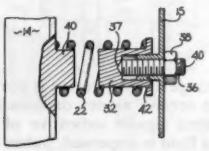
A viscous fluid clutch including relatively rotatable first and second drive members having a fluid shear space therebetween and which are cooperable with a fluid medium in the shear space to provide a shear-type fluid drive therebetween, an annular reservoir for at times storing the fluid medium, a temperature-responsive valve for controlling the flow of the fluid medium from the annular reservoir to the fluid shear space, unequally spaced and unequally radially positioned inlet ports between the reservoir and the fluid shear space for assuring a gradual increase in fan speed with increased temperature to both satisfy engine requirements and abate fan noise, and a cooperating annular cavity associated with the fluid shear space for compensating for manufacturing and assembly variations in fluid and/or reservoir volumes.

3,587,802

APPARATUS FOR ADJUSTING PRESSURE PLATE SPRING TENSION

Edward N. Pink, 7570 Woodman Place, Van Nuys, Calif.

Filed Apr. 1, 1969, Ser. No. 812,209
Int. Cl. F16d *13/75*
U.S. Cl. 192—89 **1 Claim**



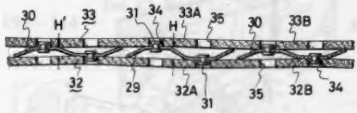
A means for adjusting the force with which the pressure plate in a clutch assembly engages the clutch disc. A member suitable for use in existing clutch assemblies is utilized for adjusting the springs that force the pressure plate against the clutch disc. The springs may be manually adjusted without disassembling the clutch assembly.

3,587,803

CLUTCH DISC WITH WAVY SURFACES

Hiroshi Sugiura; Sakae Tsuge; Izumi Hosaka, Toyota; Kunio Kusunoki, and Saburo Fujita, Kariya, Japan, assignors to Toyoto Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan and Aisin Seika Kabushiki Kaisha, Kariya, Japan, fractional part interest to each

Filed July 7, 1969, Ser. No. 839,453
Claims priority, application, Japan, July 10, 1968, 43/58587
Int. Cl. F16d *13/69*
U.S. Cl. 192—107C **3 Claims**



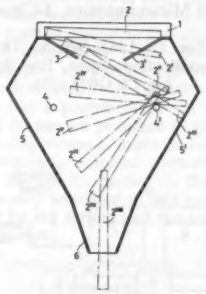
A clutch disc, particularly for use on motor vehicles, comprises a circular array of wave-shaped leaf springs formed at the peripheral portion of the disc arranged between and secured to a pair of oppositely directed friction facings. The springs of two different types having, respectively, different axial depths alternate in succession around the disc and thereby impart a wave shape to the friction facings when the clutch disc is in an unloaded condition whereby a multistage engagement of the clutch is more easily accomplished.

3,587,804

DEVICE FOR ORDERLY ARRANGING COPS AND SPOOL CORES FOR TEXTILE MACHINES

Mario Marenco, Genova, Italy, assignor to Nuova San Giorgio S.P.A., Genova, Italy

Filed Aug. 12, 1969, Ser. No. 849,344
Int. Cl. B65g *11/20*
U.S. Cl. 193—43 **3 Claims**



For arranging the cores, which are of frustoconical shape the device comprises an upper portion through which the cores can fall into the lower portion passing with their thinner end through either of two slots, whereby the thinner end can first fall on a stop bar and subsequently the thicker end freely falls down, the thinner end being thus always directed upwardly.

3,587,805

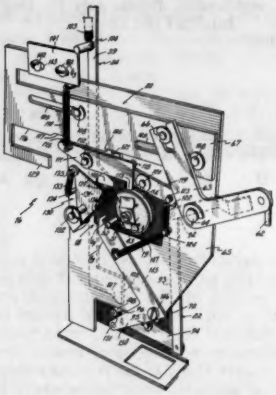
ESCROW ASSEMBLY FOR A VENDING MACHINE

William H. Rowekamp, Cincinnati, Ohio, assignor to William F. Shepherd Inc., Cincinnati, Ohio

Filed Mar. 20, 1969, Ser. No. 808,961
Int. Cl. G07f *1/00*
U.S. Cl. 194—2 **3 Claims**

An escrow assembly for a vending machine that is designed to permit vending of items worth a price between, for example, 5 cents and 1 dollar and 50 cents. The escrow assembly includes a credit device for totaling the coins deposited in the vending machine between the product purchases, an inter-

lock system interconnecting the credit device and a product dispenser to prevent the product dispenser from being actuated until a total sum equal to the cost of a product is deposited, and an accumulator box positioned to receive temporarily the coins as they are deposited after they have been totaled by the credit device. The accumulator box is



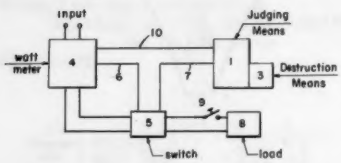
adapted to direct the coins therein to either a coin box or a coin return chute depending on whether the product dispenser is operated or a coin return device is operated by the consumer. All components of the escrow assembly are mechanically interconnected so that the vending machine does not require an electrical source to permit operation by a consumer.

3,587,806

TOKEN-DESTROYING VENDING SYSTEM

Kosei Arita, 23-10 Minamimagome, 2-Chome, Otaku Tokyo, Japan

Filed Dec. 18, 1968, Ser. No. 784,854
Claims priority, application Japan, Dec. 25, 1967, 42/82726
Int. Cl. G07f *1/06*
U.S. Cl. 194—4 **9 Claims**



A vending machine operable in response to the insertion of predetermined correct coins. The coins inserted in the machine are melted or burnt away after being evaluated. The machine may dispense articles, or control electricity, gas or water, in accordance with the value of the coin.

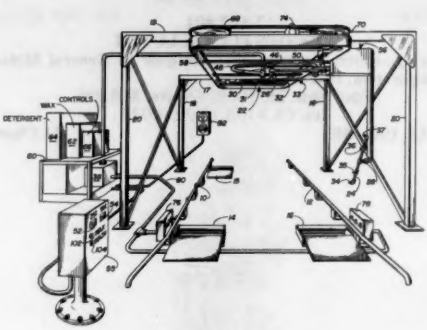
3,587,807

COIN-ACTUATED CONTROL SYSTEM FOR A VEHICLE-WASHING STATION

John B. Hickman, Grand Prairie, Tex., assignor to Zenith Equipment Manufacturing Company, Dallas, Tex.

Filed Dec. 17, 1968, Ser. No. 784,413
Int. Cl. G07f *13/00*
U.S. Cl. 194—13 **20 Claims**

Apparatus for automatically washing a stationary vehicle in a washing bay including a coin-actuated control system for sequencing the overall operation. The coin-actuated control system includes an accumulator switch and a sequencing switch. The accumulator switch responds to the value of coins deposited in a coin switch to establish a program for the operation of the car washing apparatus. The car washing apparatus includes a nozzle assembly (rotating sprinklers) supported by a motor-driven trolley on a continuous track. Movement of the trolley around the continuous track operates a rail switch to actuate the sequencing switch to its



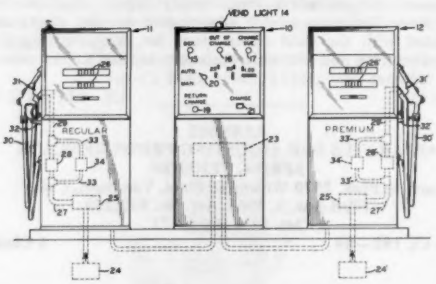
various positions. As the sequencing switch moves to its various positions, the cleaning proceeds from a wash cycle, to a rinse cycle, and a wax cycle (if desired). When the washing station includes a wheel-washing mechanism, the coin-actuated control system also controls the timing cycle for wheel washing.

3,587,808

FLUID PUMP HAVING PULSING MEANS AND MONEY ACCUMULATOR

Albert F. Romanowski, Greeneville; Larry A. May, Jonesboro, and Norman W. Hays, Telford, Tenn., assignors to Bowser, Inc.

Filed Jan. 17, 1969, Ser. No. 791,922
Int. Cl. G07f *13/00*
U.S. Cl. 194—13 **17 Claims**



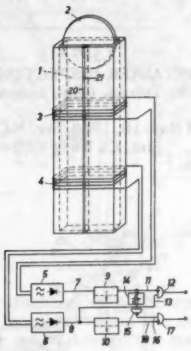
A control and change making device is provided for a fluid dispensing pump to receive money deposited by a customer and store information signals indicative of the amount of money received. As fluid is dispensed, pulses are produced to reduce the amount of stored information signals until the desired amount of fluid is dispensed. When the amount of fluid dispensed represents the amount of money received, the dispensing is automatically stopped. If the amount of fluid dispensed is less than the amount of money deposited, the customer may operate a circuit to receive the proper amount of change. As the change is given, the stored information signals are reduced until no information signals remain, at which time no further change is provided.

3,587,809

COIN TESTER WITH SLOTTED COIN GUIDE DUCT

Mario Meloni, Muri near Bern, Switzerland, assignor to Autelca AG, Gumligen, Switzerland

Filed Jan. 31, 1969, Ser. No. 795,609
Claims priority, application Switzerland, Feb. 5, 1968, 1676/68
Int. Cl. G07f 3/02
U.S. Cl. 194—100 2 Claims



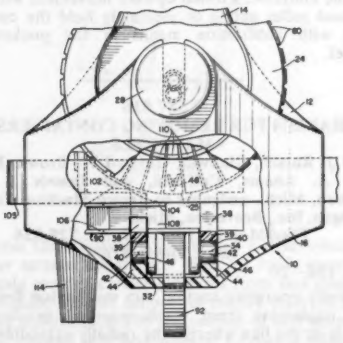
A coin tester has an oscillator with a self-induction coil surrounding a coin duct, the oscillator temporarily varying the oscillation thereof in response to the effect on the field of the coil of an object passing through the coin duct, and means responsive to the variation for indicating whether the object is an acceptable coin. The wall of the duct in the vicinity of the coil may be made of insulating material or of metal formed with a slot with insulating material in the slot.

3,587,810

EMBOSSING TOOL ADJUSTABLE FOR DIFFERENT WIDTH STRIPS

Fred Alper, Beverly Hills, Calif., assignor to Com-Tech, Incorporated, Beverly Hills, Calif.

Filed July 10, 1968, Ser. No. 743,723
Int. Cl. B41j 1/30
U.S. Cl. 197—6.7 1 Claim



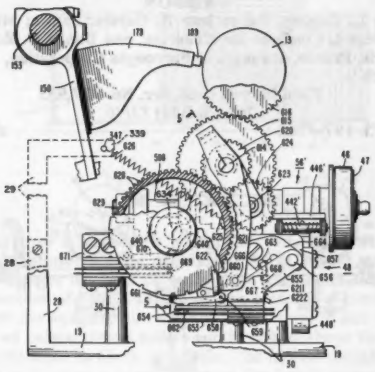
A tool for embossing predetermined markings on deformable strip material having a strip guide element manually movable to different positions within a continuous passageway extending through an embossing station in the tool to guide strip materials of different widths, corresponding to the different positions of the strip guide element, through the embossing station and position such different strip materials therein. The continuous passageway traverses the longitudinal axis of the tool and an entrance channel for each different width strip material extends through the side of the tool to a strip feeder assembly which advances the strip material along the continuous passageway and through the embossing station.

3,587,811

PLATEN POWER DRIVE FOR LINE SPACING, VERTICAL TABULATION AND FORM-FEED SPACING

Henry E. Smith, Brockport, and Donald C. Wilcox, Fairport, N.Y., assignors to The Singer Company

Filed Dec. 6, 1967, Ser. No. 688,441
Int. Cl. B41j 19/76
U.S. Cl. 197—114 5 Claims



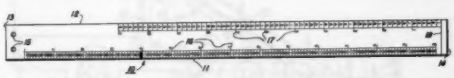
A platen power drive for line spacing, vertical tabulation spacing and form-feed spacing for use with a page printer. A clutch is coupled between a power shaft and an output shaft to turn the output shaft a fixed number of degrees per clutch cycle. The output shaft is geared to the platen which carries the document and rotates the platen one line space per clutch cycle. In addition, the output shaft drives an auxiliary shaft on which there is selectively placed a changeable program drum which has a protuberance for each line of the document. Sensing means are provided to sense the protuberances and the sensing means is made to control the clutch. Accordingly, by adjusting selected protruberances on the program drum the document, carried by the platen, may be line spaced or vertically tabulated to any preselected line location as indicated by the setting and the sensing of the corresponding protuberance.

3,587,812

FORMS REGISTRATION APPARATUS

Irwin R. Budenstein, Gloucester Township, Laurel Springs, N.J.; Richard J. Reed, Concord, Calif., and Arthur U. Johnson, Pittsford, N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Filed Jan. 11, 1968, Ser. No. 697,062
Int. Cl. B41j 15/00
U.S. Cl. 197—133 8 Claims



Forms registration apparatus having indicia along one edge of a thin semirigid, longitudinally extending bar member of generally rectangular surface configuration, the indicia representing the lateral displacement of individual print characters of the printing mechanism in a high-speed printer. A pair of apertures positioned in the bar member adjacent one end thereof are referenced to the indicia and engage mating sprocket pins on the record advance mechanism to

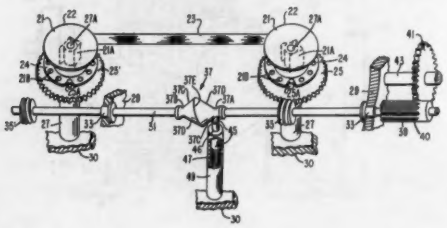
orient the bar member and indicia to the record medium. Selected ones of indicia on the bar member are registerable with selected ones of indicia on a character print position indicator attached to the print mechanism of the high-speed printer to facilitate accurate relative positioning between the print mechanism and the record medium. A second set of indicia is additionally provided along a second edge of the bar member to facilitate accurate relative positioning in the vertical direction. The forms registration apparatus may be utilized with a layout sheet for precomputing the relative positioning between the blank paper stock and the print mechanism.

3,587,813

FEED AND REVERSE MECHANISM FOR AN INKING RIBBON

Pierre L. Dugeny, Paris; Jean R. Gerain, Pantin; Michel C. Quinaud, Conflans Ste Honorine, and Daniel C. Zangheri, Paris, France, assignors to Burroughs Corporation, Detroit, Mich.

Filed May 9, 1968, Ser. No. 727,935
Int. Cl. B41j *33/46*
U.S. Cl. 197—162 **4 Claims**



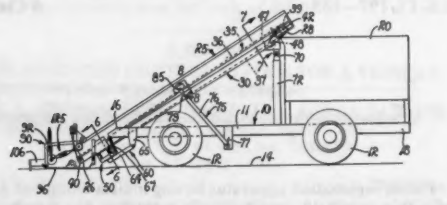
An inking ribbon is feedingly wound onto each of two spools by the rotation of a shaft and the alternate cooperation of a pair of worms with a pair of spool supporting worm wheels. When ribbon feeding is interrupted by the unwound condition of one spool, the shaft is shifted laterally to disengage the worm and worm wheel associated with the fully wound spool and to engage the worm and worm wheel associated with the unwound spool, such shifting movement of the shaft being initiated by the expelling action of the active worm from its associated wheel and completed by the action of a biased detent pin against the rotating and declining slopes of a double-coned actuator.

3,587,814

ARTICLE PICKUP MACHINE

Joseph Garabedian, and Mike Garabedian, Fresno, Calif., assignors to Valley Welding & Machine Works; Joseph Garabedian; Mike Garabedian and Charles H. Garabedian, fractional part interest to each

Filed Apr. 10, 1969, Ser. No. 815,024
Int. Cl. B65g *65/02, 65/06*
U.S. Cl. 198—7BL **5 Claims**



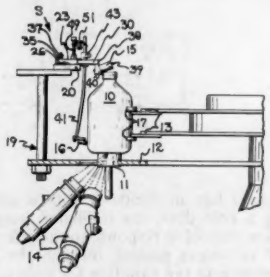
An article pickup machine having a mobile chassis adapted for ground traversing movement in a predetermined forward direction along rows of spaced articles lying on the ground providing an upwardly inclined article elevating conveyor which has a ground engaging article pickup mechanism forwardly extended therefrom and an article lifting device rotatably mounted in ground skimming relation on the pickup mechanism for rotation about a substantially horizontal axis in a direction to elevate articles and to propel them rearwardly onto the elevating conveyor incident to said ground traversing movement of the chassis with the conveyor and article pickup mechanism being mounted in free floating relation upon the chassis so as precisely to conform to elevations and depressions encountered in the rows as well as lateral inclinations in the rows toward either side of the machine.

3,587,815

GLASS CONTAINER INSPECTING APPARATUS

Thomas B. Sorbie, Toledo, Ohio, assignor to Owens-Illinois, Inc.

Filed Nov. 18, 1968, Ser. No. 776,645
Int. Cl. B65g *47/24*
U.S. Cl. 198—19 **3 Claims**



This is a device incorporated in apparatus for detecting defects in glass containers, such device serving to stabilize an upright container, a bottle for example, while resting upon a rotating spinner pad at a selected inspecting station to which such containers are brought in succession by said pads and an associated intermittently rotating starwheel. The steadying device embodies a spring-loaded holddown roller which engages the top end of the container neck as a direct result of upward movement of both the pad and container thereon, so that the latter is grasped firmly between the pad and roller. A second roller yieldingly engages a side surface area of the container in response to slight upward travel of the first roller due to the container's initial upward movement with the pad, the second roller acting to yieldingly hold the container in contact with antifriction means in the pockets of the starwheel.

3,587,816

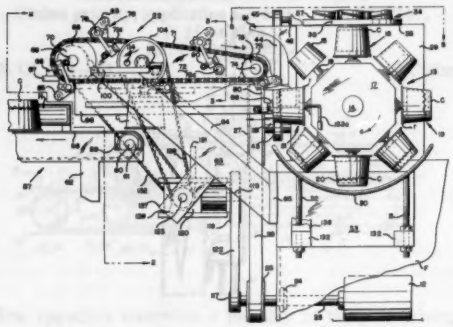
MECHANISM FOR REMOVING CONTAINERS FROM MANDRELS

Edward J. Russell, Gladwin; Gaylord W. Brown, Beaverton; Gary A. Adams, Coleman, and Dennis J. Dorman, Coleman, Mich., assignors to Brown Machine Company of Michigan, Inc., Beaverton, Mich.

Filed May 14, 1968, Ser. No. 729,056
Int. Cl. B65g *47/04*
U.S. Cl. 198—20 **24 Claims**

Positively operating suction cup mechanism for removing plastic containers from turret-mounted printing-machine mandrels or the like wherein the radially extending mandrels of the turret are indexed between a container-loading station, a container-printing station, and a container-unloading station, wherein endless transfer conveyor means pivotally carrying spaced-apart suction cup assemblies thereon has a run extending toward a mandrel halted at the unloading station and thence endwisely away from the mandrel in a direction axially parallel with the mandrel to withdraw a container from the mandrel, cam track means is provided adjacent the unloading station which is engaged by a single follower on each suction cup assembly and swings a suction cup endwisely in toward the end of a container on the mandrel as the suc-

tion cup assembly is bodily moving away from the mandrel to engage the suction cup with the end of a container on the mandrel and thence, when the container has been withdrawn endwisely off the mandrel, swings the removed container to a



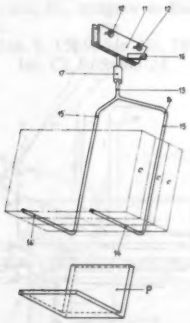
vertical position for discharge, and wherein a sensor interrupts movement of the turret means if a container remains inadvertently on the mandrel when the mandrel leaves the unloading station.

3,587,817

METHOD OF TRANSFERRING OBJECTS BETWEEN MOVING CONVEYORS

Rene Bornstein, Antony, and Gerard Dubus, Combs-La-Ville, France, assignors to Service D'Exploitation Industrielle Des Tabacs Et Des Allumettes, Paris, France

Filed May 16, 1968, Ser. No. 729,672
Claims priority, application France, May 17, 1967, 106641
Int. Cl. B65g *47/00*
U.S. Cl. 198—20 **4 Claims**



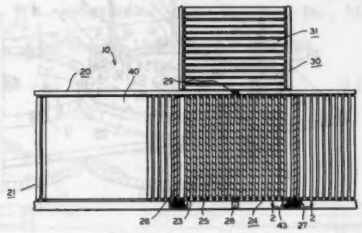
Apparatus for effecting a transfer in a determinate zone, hereinafter termed the transfer zone, of loads conveyed by continuously moving carrier elements from said elements to an intermediate transfer support or mobile relay, of the kind comprising control means of the motion of said intermediate support so devised that said support follows a trajectory of which a portion at least intersects the trajectory of said carrier elements within said transfer zone, said control means and said carrier elements being so devised that the motion of the carrier element involved in the transfer over that part of its trajectory which corresponds to said transfer zone causes said intermediate support to move over a corresponding part of its own trajectory, to wit the part thereof which likewise extends through said transfer zone, whereby said carrier element and said intermediate support reach the point of intersection of their trajectories at the same instant.

3,587,818

MEANS AND METHOD FOR TRANSPORTING ARTICLES WITH A CONVEYOR SYSTEM

Howard C. Hansen, Battle Creek, Mich., assignor to Clark Equipment Company

Filed July 16, 1968, Ser. No. 745,261
Int. Cl. B65g *47/00*
U.S. Cl. 198—20 **6 Claims**



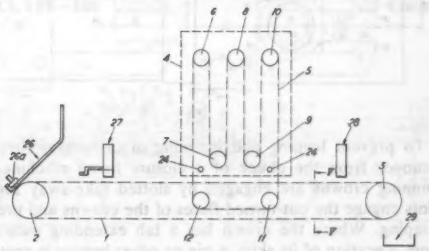
A conveyor system has a main conveyor and an auxiliary conveyor intersecting the main conveyor to enable transferring of articles between the conveyors. The main conveyor has a section of helical thread rollers adjacent the intersection with the auxiliary conveyor. A roller on each side of the section of helical thread rollers can be raised above the level of the conveyor to block an article. The helical threads then operate to produce a lateral force on the article to move the article to the auxiliary conveyor.

3,587,819

TRANSFER MECHANISM

Gordon Asquith Deakin; Alan Eastwood, and Gordon Vinnicombe, Park Royal, England, assignors to W.R. Grace & Co., New York, N.Y.

Filed Oct. 28, 1968, Ser. No. 771,203
Claims priority, application Great Britain, Oct. 30, 1967, 49,134/67
Int. Cl. B65g *15/00, 47/00*
U.S. Cl. 198—20 **12 Claims**

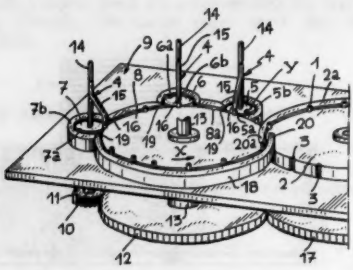


The specification discloses a mechanism for transferring articles from one conveyor to another at a point where the two conveyors are moving along nonparallel paths. Studs on each conveyor engage in respective apertures in the article to support and locate the article. Preferably the conveyors are arranged to carry container closures through a closure-moulding device which may also include a combined tool for severing a pellet from a rod of thermoplastic material and placing the pellet in a closure ready for cold moulding.

3,587,820
ROTARY ARTICLE TRANSFER APPARATUS

Maurice Lachaussee, 360, rue de l'Yser, Ans-Lex-Liege, Belgium

Filed Sept. 3, 1968, Ser. No. 756,938
Claims priority, application Belgium, Nov. 8, 1967, 41,521
Int. Cl. B65g 47/74
U.S. Cl. 198—22 3 Claims

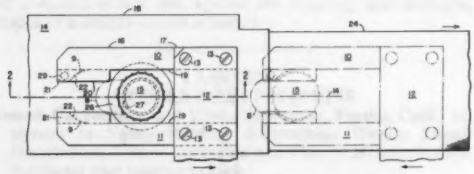


Apparatus for feeding articles to pockets in the periphery of a rotary conveyor comprises a vertical chute mounted above a rotary transfer member that travels at the same peripheral speed as the periphery of the rotor, an upper portion of the chute being coaxial with the transfer member and a lower portion of the chute being inclined downwardly outwardly to the periphery of the transfer member and rotating with the transfer member so that articles passing down the chute are progressively accelerated to the peripheral speed of the rotor and transfer member.

3,587,821
TAKE-AWAY FINGERS

James J. Rosati, Woburn, and Richard C. Boulton, Wilmington, Mass., assignors to W. R. Grace & Co., Cambridge, Mass.

Filed Jan. 2, 1969, Ser. No. 788,436
Int. Cl. B65g 47/74
U.S. Cl. 198—22 6 Claims



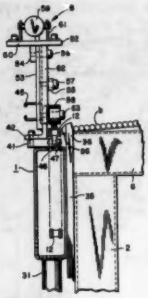
To prevent leaping and jamming of crowns as they are removed from the chuck of a closure lining machine, the spinning crowns are engaged by slotted take-away fingers. Slots engage the out-turned flutes of the crowns and prevent jumping. Where the crown has a tab extending outwardly from a portion of its skirt, a pin or other barrier is provided to engage the tab so that all tabs are aligned for delivery to removal apparatus.

3,587,822
TUBE AND BAR FEEDER

Frank F. White, Shaker Heights, Ohio, assignor to Automation Development Corporation, Mentor, Ohio

Filed July 1, 1969, Ser. No. 838,254
Int. Cl. B65g 47/04
U.S. Cl. 198—26 13 Claims

A bar feeder having continuous high speed feeding provided by a unique escapement mechanism and hold down rollers which press each bar against the conveyor to effect feeding. The escapement fingers have inclined upper surfaces which lift one bar only from the feed ramp over a fixed stop and push it onto the conveyor. A special arrangement per-

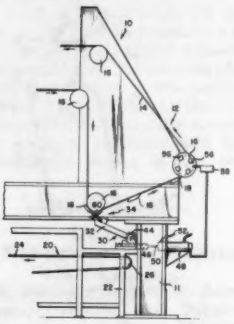


mits the escapement fingers to handle an exceptionally wide range of different diameters. Both the box beam and the feed ramps are supported by rows of jacks to provide instant uniform adjustment.

3,587,823
TRANSFER MECHANISM

Gerald Hartz, Henrico, Va., assignor to Reynolds Metals Company, Richmond, Va.

Filed Feb. 6, 1969, Ser. No. 797,018
Int. Cl. B65g 47/08
U.S. Cl. 198—27 21 Claims



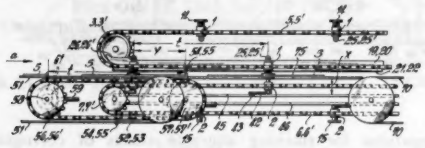
A transfer mechanism wherein articles are transferred in a gentle manner from a first conveyor to a second conveyor located at a lower elevation with respect to the first conveyor. An article transfer means positioned between the conveyors receives a plurality of articles from an article holder means on the first conveyor and moves through an arcuate path to deposit them onto the second conveyor. Rack and pinion means are used to move the article transfer means in synchronism with the movement of the first conveyor. First camming means synchronize with the first conveyor control the actuation of the rack and pinion means and a second stationary camming means releases the articles from the article holder means to enable them to be received by the article transfer means.

3,587,824

APPARATUS FOR TURNING ADVANCING FLAT WORKPIECES IN THEIR PLANE OF TRAVEL, FROM A LONGITUDINAL TO A TRANSVERSE ATTITUDE

Kurt Rochla, Lengerich, Westphalia, Germany, assignor to Windmoller H. Holscher

Filed Nov. 25, 1968, Ser. No. 778,576
Claims priority, application Germany, Nov. 29, 1967, P 15 86 347.5
Int. Cl. B65g 47/24
U.S. Cl. 198—33 9 Claims



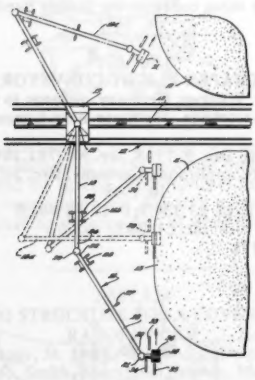
The apparatus comprises a plurality of two-part turning devices, which have upper parts that have the same pitch as the tube sections and are secured to an upper chain or similar conveyor element, which revolves above the plane of travel of the tube sections at the same speed as the latter, and lower parts, which have the same pitch and are carried by a lower chain or the like, which revolves below the plane of travel as the tube sections and at the same speed of the latter. The distance between the adjacent courses of the two revolving chains is such that the turntables of the parts of the turning devices engage the tube sections from above and below and grip the tube sections as said parts move around the sprocket wheels. At least one of the turntables is turned through 90° as it continues to move so that the tube sections are turned from a longitudinal attitude to a transverse one while they are moved jointly with the turntables.

3,587,825

JACKKNIFE TYPE CONVEYOR FOR RECLAIMING MATERIAL

Fred T. Smith, Aurora, Ill., assignor to Barber-Greene Company, Aurora, Ill.

Filed Jan. 6, 1969, Ser. No. 789,133
Int. Cl. B65g 65/28
U.S. Cl. 198—36 7 Claims



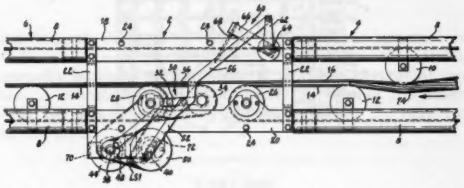
A jackknife conveyor system for transporting material from a material-handling device to a loading conveyor comprises a first conveyor pivotally connected to the second conveyor with the material-receiving ends of the first conveyor being pivotally connected to the material-handling device such as a reclaimer. The discharge end of the second conveyor is located to discharge into a loading conveyor preferably through a surge bin. In operation the two conveyors pivot relative to each other about their point of connection as the reclaimer moves along the pile being reclaimed. The pivotal movement between the conveyors enables relative movement of the reclaimer with respect to the point for discharging the material into a surge bin or onto a fixed loading conveyor.

3,587,826

DIVERTING SWITCH MECHANISM FOR CONVEYORS

John M. Holzer, West Allis, and Palmer T. Severson, Wauwatosa, Wis., assignors to Cutler-Hammer, Inc., Milwaukee, Wis.

Filed Mar. 6, 1969, Ser. No. 804,764
Int. Cl. B65g 37/00
U.S. Cl. 198—83 9 Claims



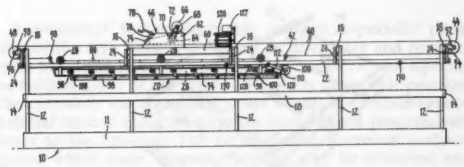
A lapped stream of articles transported along a wire belt conveyor system is interrupted and diverted through a conveyor gap normally spanned by a pivotable bridging conveyor section. A stream interrupting finger assembly is momentarily driven into the stream ahead of the bridging section while the upstream end of the latter is pivoted across the stream path to open the conveyor gap. Both the finger assembly and bridging section are driven by a common linkage powered by the conveyor through a single revolution clutch. Alternate operations reverse the bridge movement to restore the stream to its original path of travel.

3,587,827

MATERIAL DISTRIBUTOR

Gerald L. Schoen, Kaukauna, Wis., assignor to Badger Northland Inc., Kaukauna, Wis.

Filed Jan. 28, 1969, Ser. No. 794,538
Int. Cl. A01k 5/00; B65g 25/04
U.S. Cl. 198—106 7 Claims

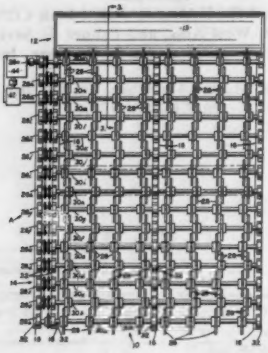


A livestock feeding arrangement with a feed bunk, a pair of rails mounted above the feed bunk and a carriage mounted on the rails for horizontal reciprocating movement above the feed bunk. A plurality of trays are pivotally mounted on the carriage to form a channel that is filled with feed as the carriage passes under a conveyor. When the carriage reaches a preselected position on the rails, all the trays are simultaneously pivoted to unload the feed carried by the trays and the direction of movement of the carriage is reversed.

3,587,828
CONVEYING APPARATUS

Alexander Ferko, Salem, Ohio, assignor to Gulf & Western Industrial Products Company, Grand Rapids, Mich.

Filed Jan. 27, 1969, Ser. No. 794,223
Int. Cl. B65g *35/08*
U.S. Cl. 198—108 6 Claims

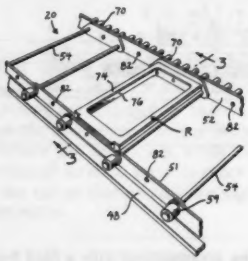


Conveying apparatus for conveying elongated bars and the like including a plurality of generally horizontal rows of star wheel members each having radially extending arms. The star wheel members in each row are mounted for rotation about an axis common to all other star wheels in the same row and generally parallel to the axis of the star wheels in the next adjacent row. The arms of the star wheels in each row are offset from those in the next adjacent rows and the arms are of a length sufficient to produce a substantial overlap between star wheels in adjacent rows. Additionally, drive means are provided so that the star wheels are all rotated in the same direction. Consequently, a bar supported by arms of the star wheels in one row will be transferred to the arms of the star wheels in the next adjacent row in the direction of rotation.

3,587,829
CONVEYOR WITH INTERCHANGEABLE RECEIVERS

Robert P. Sorensen, Rockford, Ill., assignor to Anderson Bros. Mfg. Co., Rockford, Ill.

Continuation-in-part of application Ser. No. 554,284, May 24, 1966, now Patent No. 3,436,894, dated Apr. 8, 1969. This application Apr. 4, 1969, Ser. No. 813,618
Int. Cl. B65g *17/06*
U.S. Cl. 198—131 7 Claims

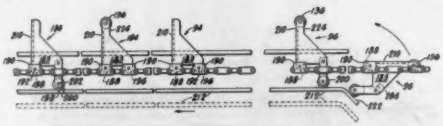


A conveyor advances a number of containers past a filler, sealing head, and cutter. The conveyor has a plurality of pivotally interconnected frames which support removably mounted receivers. Each frame has a plurality of equally spaced pins adjacent the top and the filler, sealing head, and cutter have teeth which mesh with the pins to drive them correlative to the movement of the conveyor.

3,587,830
STACKING SYSTEM FOR PAPERBOARD BLANKS

Mircea Calistrat, Baltimore, Md., assignor to Koppers Company, Inc.

Division of Ser. No. 666,605, Sept. 11, 1967, Patent No. 3,447,696. Filed Nov. 27, 1968, Ser. No. 810,868
Int. Cl. B65g *19/26*
U.S. Cl. 198—170 2 Claims

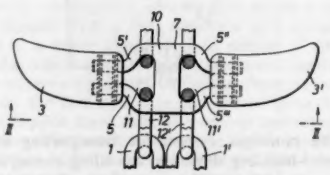


Apparatus for stacking alternate stacks of corrugated paperboard blanks discharged from a blank-forming machine faceup and facedown to reduce warping comprising an intermittently rotating transverse storage conveyor means for receiving and temporarily storing stacks of blanks in faceup position from an in-line conveyor adjacent the blank-forming machine; an inverter for sequentially receiving stacks from the storage conveyor and inverting alternate stacks to a facedown position on a rising conveyor comprising a guide for directing the stacks into a substantially vertical position with the stack resting on its leading edge on the rising conveyor where a pivoting finger carried by the rising conveyor engages the bottom edge of a first stack on the conveyor to advance it along the conveyor thereby positioning the first stack faceup, an inverting lever adjacent the underside of a subsequent stack intermittently operable to engage the underside surface of this second stack to pivot it about its bottom edge so that it descends onto the rising conveyor with its underside up, first and second advancing fingers for sequential engagement with the trailing edges of the first and second stacks to advance them along the rising conveyor; a stacker for receiving stacks of blanks from the rising conveyor and stacking them one under the other to form a pile of blanks comprising a lifting conveyor including a stop for positioning each of the stacks, means for raising the lifting conveyor, with the stack thereon, a distance slightly greater than the height of the stack, a support for engaging the bottom face of the lifted stack to maintain the stack in its lifted position, means for lowering the lifting conveyor to receive another stack for repeating the foregoing lifting operation, and means rotating the lifting conveyor in its uppermost position when the pile of blanks reaches a selected height to discharge the pile on a skid or other conveyor for further handling.

3,587,831
SCRAPER-FLIGHT CONVEYOR

Helmut Temme, Waltrop, Germany, assignor to Gewerkschaft Eisenhutte Westphalia, Wethmar near Lunen, Westphalia, Germany

Filed Dec. 9, 1968, Ser. No. 782,289
Claims priority, application Germany, Dec. 20, 1967, June 10, 1968
P 15 83 139.7; P 17 58 481.5
Int. Cl. B65g *19/00*
U.S. Cl. 198—171 8 Claims



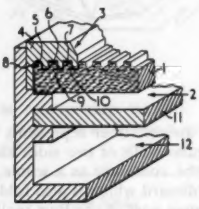
In a scraper-flight conveyor having scraper arms mounted on chain disposed longitudinally of the conveyor for working movement of the scraper arms by longitudinally moving the

chain, the improvement which comprises two chains disposed adjacent the longitudinal centerline of the conveyor, each comprising short chain sections couplers each joining together adjacent ends of adjacent sections of each of the chains and the two chains the scraper arms being mounted on the couplers.

3,587,832
CONVEYORS

Peter M. Robinson, Sutton Coldfield, and Peter J. Jenkins, Sandbach, England, assignors to The Dunlop Company Limited, London, England

Filed Oct. 25, 1968, Ser. No. 770,562
Claims priority, application Great Britain, Nov. 3, 1967, 50082/67
Int. Cl. B65g *15/00*
U.S. Cl. 198—184 **6 Claims**

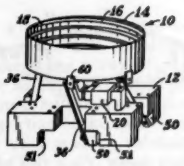


A belt conveyor wherein a load-carrying portion of the belt is supported by causing the air pressure below that portion to be greater than the air pressure above that portion of the belt, of which the following is a specification.

3,587,833
ROTARY VIBRATORY FEEDER

Grover E. Byrum; Myron L. Doty; Charles O. Hendricks, and Floyd Robert Jennings, Indianapolis, Ind., assignors to Service Engineering, Inc., Cumberland, Ind.

Filed June 7, 1968, Ser. No. 735,448
Int. Cl. B65g *27/00*
U.S. Cl. 198—220AC **6 Claims**



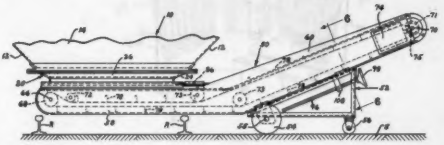
A vibratory conveyor of rotary type, whose bowl-supporting springs are connected to the reaction base at a low location thereof, and the several components of the bowl-support and vibration-energization are provided in oppositely facing arrangement making the direction of work-feed easily reversible.

3,587,834
UNLOADING STRUCTURE FOR A COVERED HOPPER RAILWAY CAR

Richard H. Dugge, St. Louis; Dennis J. Schipper, St. Charles, and Garth R. Smith, Maryland Heights, Mo., assignors to ACF Industries Incorporated, New York, N.Y.

Filed Jan. 7, 1969, Ser. No. 789,481
Int. Cl. B65g *41/00*
U.S. Cl. 198—233 **4 Claims**

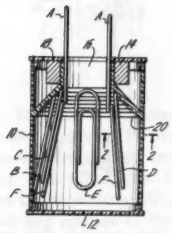
An unloading structure for unloading lading from the bottom discharge outlet on either side of a covered hopper railway car. A conveyor structure having wheels thereon is rolled beneath the bottom discharge outlet and outwardly projecting horizontal flanges on the upper surface of the conveyor structure match interfitting inwardly projecting flanges on the bottom outlet which extend in a direction transversely of the car. The flanges on the conveyor structure slide along the upper surfaces of the interfitting flanges on the bottom outlet to position the conveyor accurately with respect to the outlet. Releasable latch means retains the conveyor in position beneath the bottom outlet. The conveyor structure includes a horizontal portion directly beneath the outlet and an upwardly inclined portion integral with the horizontal portion. A wheeled frame is mounted for sliding movement along the upwardly inclined portion to adjust the height of the conveyor.



3,587,835
PAPER CLIP CONTAINER

Sidney X. Shore, 29 Wren Drive, Roslyn, N.Y.

Filed Oct. 3, 1969, Ser. No. 863,636
Int. Cl. B43m *17/00;* **A45c** *11/24*
U.S. Cl. 206—1 **3 Claims**



A container for magnetizable articles, especially paper clips of the type having elongated parallel sides and rounded ends, has a top opening and a magnet adjacent the opening for holding some of the articles in readily accessible position. The container has a stepped series of ridges of nonmagnetic material spaced closely below the magnet and progressively closer to the opening. The ridges define abutment surfaces against which some magnetic articles may be attracted and arrested so as to be held available as a reserve supply after the rest of the supply of articles is exhausted.

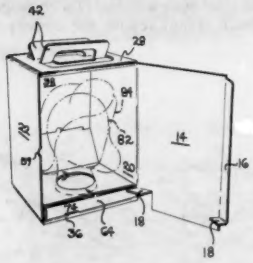
3,587,836
ARTICLE SUSPENSION AND CARRYING CONTAINER

Gerald N. Brown, Hialeah, Fla., assignor to Owens-Illinois, Inc.

Filed Apr. 11, 1969, Ser. No. 815,336
Int. Cl. A45c *11/02*
U.S. Cl. 206—8 **7 Claims**

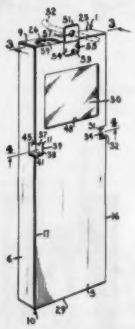
An article suspension and carrying container which includes a die cut corrugated box and a die cut corrugated insert which are scored and cut out in such a manner that when

they are folded and set up, the insert is adapted to rigidly hold an article in an offset position so that suitable clearance



is continuously maintained between the article being held and the walls of the corrugated box.

3,587,837
PILFER-PROOF PACKAGE
Jerry R. Smith, and Sigmond Harvey Laner, Shawnee Mission, Kans., assignors to Recco, Inc., Kansas City, Mo.
Continuation-in-part of application Ser. No. 808,129, Mar. 18, 1969, now abandoned. This application Nov. 3, 1969, Ser. No. 873,500
Int. Cl. B65d *5/50, 25/10*
U.S. Cl. 206—45.14 **1 Claim**



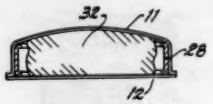
The new package or carton in this application is substantially pilfer-proof and is of such overall dimensions so as to be incapable of being placed in a conventional pocket, or pockets, of men's, women's and children's apparel and/or incapable of being placed in a container of such conventional dimensions as a woman's or girl's purse, handbag or the like, thereby reducing to a minimum pilfering of the carton with one or more stereo tape cartridges, or at least one stereo tape cartridge, and another different article, if desired, therein, and with at least one of the articles being readily viewable through aperture means in at least one of the opposed walls of the carton and if, as is obvious, one of the cartons were placed in a pocket or purse or the like, the same would be readily seen by a proprietor or a clerk or a store detective.

3,587,838
PACKAGING CONTAINER
Yoshimasa Miyata, Osaka, Japan, assignor to Planny Kabushiki Kaisha (Planny, Ltd.), Osaka, Japan
Filed Mar. 3, 1969, Ser. No. 803,662
Claims priority, application Japan, June 12, 1968, Dec. 24, 1968, 43/49397;43/112936
Int. Cl. B65d *5/58, 85/30*
U.S. Cl. 206—46 **24 Claims**

A packaging container thermoformed out of one sheet of thermoplastic material to contain an article or articles in suspension by means of four separate walls provided with cavities, which are formed along the top of four separate triangular or similar projections so as to form the complete contour or sometimes the sustaining walls larger than the contour of some parts of the article or articles, when this container is folded up at the lines separating these projec-

tions; the folded up container represents a handy box with square or rectangular walls of two sides enhancing the structural strength of the container as a whole, a sheet of plastic material or of cardboard which is also foldable is attached to one end of the flange part of the thus realized container and folded over the already folded body of the container as its external cover.

3,587,839
PACKAGE AND METHOD OF PACKAGING A PRODUCT
Forrest G. Von Brecht, 6 Forest Ridge, Clayton, Mo., and Ryder Pratt, 515 Cresent Drive, Kirkwood, Mo.
Continuation-in-part of application Ser. No. 665,010, Sept. 1, 1967, now abandoned. This application Feb. 20, 1969, Ser. No. 814,223
Int. Cl. B65b *53/00;* **B65d** *75/28, 85/70*
U.S. Cl. 206—46 **8 Claims**

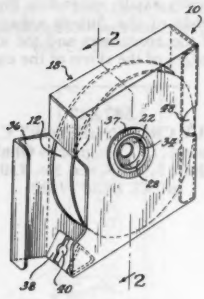


A product packaged between two soft, heat sealable, synthetic, plastic films, one being stretchable and elastic and the other being heat shrinkable. The films are brought together and heat sealed along a line circumscribing the product. The heat shrinkable film is then heat shrunk sufficiently to draw both films taut over the product and stretch the stretchable film, the stretchable film acting to limit the stress on the heat sealed seams during heat shrinking and to thereafter take up slack due to relaxation of the heat shrunk film.

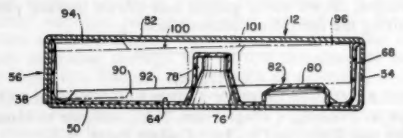
3,587,840
DISPENSER FOR TUBING AND THE LIKE
Wayne Marshall Hultberg, Glenview, Ill., assignor to Baxter Laboratories, Morton Grove, Ill.
Filed June 12, 1969, Ser. No. 832,696
Int. Cl. B65d
U.S. Cl. 206—52 **2 Claims**

A dispenser for tubing and the like having an inner cylindrical spool positioned inside of an outer rectangular hollow container made from a folded unitary sheet. A pair of hubs

project through apertures in the sides of the container into an axial passage in the spool to hold the spool within the container in rotatable relationship thereto. This dispenser is made at very low cost, and serves as a combined dispenser and shipping container.



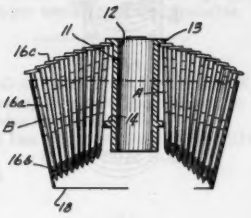
3,587,841
CASSETTE PACKAGING
Kevork Devejian, 36-25 Prince St., Flushing, N.Y.
Continuation-in-part of Ser. No. 839,153, July 7, 1969. Filed Sept. 4, 1969, Ser. No. 855,182
Int. Cl. B65d *5/04, 85/67*
U.S. Cl. 206—52 **6 Claims**



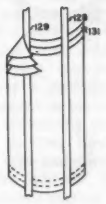
Packaging for a cassette cartridge comprising a cassette cartridge holding means and covering means therefor, the holding means comprising a tray adapted to receive the cassette, the cassette having an enlarged portion, the tray being provided with improved graduated means for compensating for the enlarged portion of the cassette so that the cassette is held in the tray at a position substantially level with the upper edges of the tray walls, which graduated means, at the same time, provide the cassette with additional support means in that the cartridge does not rest on the floor of the tray itself but, is rather elevated therefrom and impact damage to it is therefore minimized, the covering means comprising an open ended sleeve adapted to tightly fit over and cover the cassette and the tray.

3,587,842
CARTRIDGE OF COLLATED FASTENERS
Robert H. Keck, and James K. Goode, Jr., Cary, Ill., assignors to Spotnails, Inc., Rolling Meadows, Ill.
Filed Oct. 10, 1969, Ser. No. 875,434
Int. Cl. B65d *83/02*
U.S. Cl. 206—56DF **9 Claims**

A cartridge of collated fasteners is provided which facilitates the handling of a plurality of fasteners when loading a fastener-driving tool or when said fasteners are to be stored or transported to the job site. The cartridge includes a spool member having an outwardly projecting shoulder adjacent one end and stop means adjacent the other end thereof, a fastener strip snugly coiled about the spool member, a wrapper encompassing the outermost row of fasteners, and removable means overlying a predetermined number of the head ends of the collated fasteners. The head ends of the fasteners are in nested relation and provide a substantially domelike configuration to the upper exposed surface of the cartridge.



3,587,843
PACKAGE OF BAGS
Ralph L. Wing, Greenville, S.C., assignor to W. R. Grace & Co., Duncan, S.C.
Filed Sept. 11, 1967, Ser. No. 666,855
Int. Cl. B65d *75/42*
U.S. Cl. 206—57 **1 Claim**



This invention is directed to a chain of imbricated bags connected together and supported by two strands of tape; the bags each have two overlying sides, one of the sides being secured to both of said tapes, the bags open ends are oriented in the same direction respecting the tapes and each bag after the bottom bag relative to the tape is offset along the tapes and overlies the opening of the underlying bag; the tapes are spaced apart about an equal distance where they engage each of said bags; and the lead bag inflates to a relatively square opening when the tapes are held in parallel spaced apart disposition on a flat surface; the bags are secured to the tape with a tack sufficient to allow a pull in excess of 2 pounds to separate the bags from the tape and to hold the bags securely to the tape against a pull of less than one-half pound when the pull is applied at an angle of 30°.

3,587,844
PACKAGE OF BAGS
Ralph L. Wing, Greenville, S.C., assignor to W. R. Grace & Co., Duncan, S.C.
Filed Sept. 11, 1967, Ser. No. 666,744
Int. Cl. B65d *27/10, 85/62*
U.S. Cl. 206—57A **4 Claims**

This invention is directed to a package of imbricated bags, each of the bags after the bottom bag is offset forward from the next underlying bag and overlies the opening of the underlying bag and the top side of the underlying bag is attached to the bottom of the overlying bag in sequence; in one specie the bags are attached together by an adhesive applied

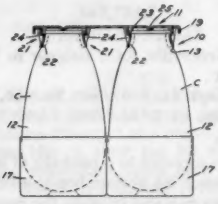
in substantially equal amounts to each half of the bag from a medial division of one side thereof; in another specie the

bags are attached together by fusing the sides together to provide a wholly self-supporting chain of imbricated bags; all as described hereafter.

3,587,845
PACKAGE OF BAGS
Ralph L. Wing, Greenville, S.C., assignor to W. R. Grace & Co., Duncan, S.C.
Continuation-in-part of application Ser. No. 666,744, Sept. 11, 1967. This application Aug. 29, 1968, Ser. No. 756,137
Int. Cl. B65d *27/10, 85/62*
U.S. Cl. 206—57A **1 Claim**

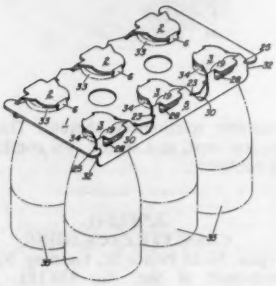
This invention is directed to a package of imbricated bags, each of the bags after the bottom bag is offset forward from the next underlying bag and overlies the opening of the underlying bag and the top side of the underlying bag is attached to the bottom of the overlying bag in sequence; in one specie the bags are attached together by adhesive members having adhesive on opposite sides thereof; in other species the bags are attached together by a direct union surface seal of the sides together to provide a wholly self-supporting chain of imbricated bags.

3,587,846
CONTAINER PACKAGES
Robert J. Heier, Whitehouse, Ohio, assignor to Owens-Illinois, Inc.
Filed Apr. 9, 1969, Ser. No. 814,756
Int. Cl. B65d *71/00, 85/62, 85/30*
U.S. Cl. 206—65 **28 Claims**



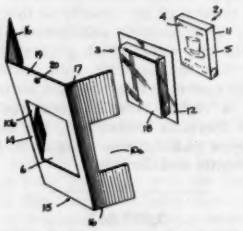
A container package comprising a plurality of containers and a carrier. Each container includes a glass body having a bulbular lower portion and concavely curved upper portions with a peripheral lip defining a mouth that is closed by a cover having a peripheral skirt. The bulbular body portion is supported in a plastic cup that serves as a base for the container. The carrier comprises a body with portions overlying the caps and generally axially extending fingers with shoulders. The lower ends of the fingers engage the concavely curved portions of the containers and the shoulders are engaged by the free edges of the skirts of the caps.

3,587,847
SINGLE-PLY CROWN SUPPORT CARRIER
Earl J. Graser, Monroe, La., assignor to Olinkraft, Inc.
Filed June 5, 1969, Ser. No. 830,716
Int. Cl. B65d *71/00*
U.S. Cl. 206—65 **6 Claims**



A single-ply, multiple-article carrier comprising a base panel having means therein to secure said panel to the carried articles, crown cover panels and crown locking panels for securing the carried articles in place.

3,587,848
PACKAGE CONSTRUCTION AND METHOD OF MAKING
Rudolph A. Froehlig, College Point, N.Y., assignor to Modern Album and Finishing Co., Inc., College Point, N.Y.
Continuation-in-part of application Ser. No. 815,160, Apr. 10, 1969. This application June 23, 1969, Ser. No. 835,555
Int. Cl. B65d *73/00*
U.S. Cl. 206—78 **3 Claims**



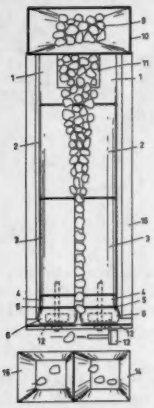
A package that allows inspection of the four sides of the article contained therein through article viewing areas on opposed sides. The large opening on one side is covered by a piece of transparent, rigid plastic that has a raised portion to accommodate the front and sides of the article to be viewed and has flanges at its inner end which are joined to the interior surface of the package adjacent the viewing area. The other article viewing area is not covered and is smaller than the dimensions of the article contained in the package. It allows inspection of the rear of the package. The entire package is held together by a pressure sensitive glue which is applied to the package's inner surfaces.

3,587,849

ALIGNING AND SORTING BODIES

Francis Bosworth Dwyer, New South Wales, Australia, assignor to The Colonial Sugar Refining Company Limited, Sydney, New South Wales, Australia

Filed Apr. 9, 1969, Ser. No. 814,646
Claims priority, application Australia, Apr. 10, 1968, 36290/68
Int. Cl. B07c *5/344*
U.S. Cl. 209—73 6 Claims



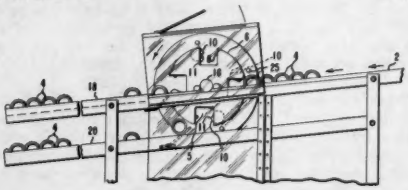
Apparatus for sorting bodies on the basis of the impedance-affecting characteristics thereof, comprising an inclined trough formed by the trough-defining surfaces of a pair of closely spaced rotating rollers. The rollers are divided into three sections longitudinally, (i) an upper section of major extent connected to a source of one electrical potential, (ii) a narrow intermediate insulating section, and (iii) a lower section of minor extent connected to a source of another electrical potential. Bodies are fed into the upper section and are aligned and conveyed down the trough. When in transit through the narrow intermediate section, they come into bridging contact with an electrical circuit including the upper and lower sections of the trough. An electrical signal is produced diagnostic of the impedance-affecting characteristics of each body, and after discharge from the lower section of the trough, an air blast is actuated as required to affect the body's trajectory of fall and effect sorting. The rollers are preferably modified to increase the normal reaction applied to the bodies in the critical sampling region. The apparatus is useful for sorting low resistivity metalliferous ore from barren rock, but can also be used for sorting bodies having the same resistivity but whose physical characteristics nonetheless differ in such a way as to enable a diagnostic electrical signal to be produced when their resistivities are measured.

3,587,850

APPARATUS FOR SORTING CYLINDRICAL OBJECTS

Burness Carl Dick, Nashville, Tenn., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 29, 1969, Ser. No. 854,229
Int. Cl. B07b *13/04*
U.S. Cl. 209—73 3 Claims



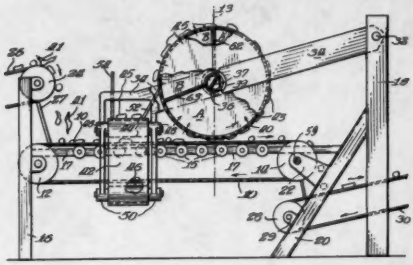
An apparatus for gauging the diameter of cylindrical objects being moved from a supply source to a plurality of receiving stations and sorting the objects according to size. A pair of rotatably mounted spaced discs presenting paired slots sequentially to the supply and receiving stations have mounted for rotation with them a gauging means positioned in relation to each pair of the slots for retaining objects less than a preselected diameter in the slots beyond one station to discharge them at another station. The gauging means for each pair of slots are simultaneously adjustable.

3,587,851

RAG SEPARATION EQUIPMENT

Ingvar G. Anderson, Wheaton, Ill., assignor to Metropolitan Waste Conversion Corporation

Filed Dec. 30, 1968, Ser. No. 787,916
Int. Cl. B07c *3/02*
U.S. Cl. 209—74 6 Claims



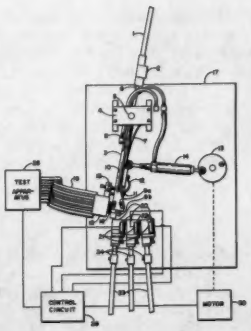
Apparatus for removing waste materials including rags from an assortment of waste materials being conveyed past a rag removal station and consisting of a rotatable cylinder contacting the material due to its own weight and driven by movement of the conveying means under the rotatable cylinder. The cylinder has a perforated surface in contact with the materials and means is provided in one portion of the surface adjacent the conveying means to provide subatmospheric pressure or suction through the perforations thereof which draws the rags and similar materials into contact with the surface of the cylinder. To remove the adhered rags from the cylinder another section thereof is subjected to atmospheric pressure as opposed to subatmospheric pressure whereby the rags are released from the surface of the rotatable cylinder and may fall into a take-away conveyor or the like to remove them from the vicinity of the conveying means and dispose of them by further processing.

3,587,852

CONTROL APPARATUS

Donald L. Kamm, and Gene W. Ross, Minnetonka, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

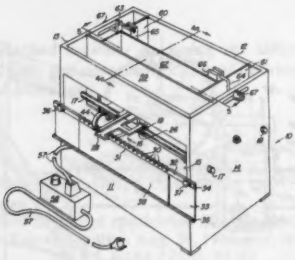
Filed May 19, 1969, Ser. No. 825,767
Int. Cl. B07c *3/02*
U.S. Cl. 209—748 4 Claims



Apparatus for automatically sorting and testing electronic components. The preferred embodiment of the apparatus

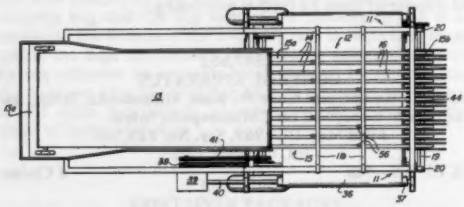
comprises means for receiving components from an input magazine, positioning each component in a test fixture for automatic testing, and outputting the component into one of a plurality of output magazines dependent on the automatic testing results.

3,587,853
EDGE-PUNCHED DATA CARD SORTER
Edward D. Barnes, Salt Lake City, Utah, assignor to Datacap Systems, Salt Lake City, Utah
Filed Dec. 9, 1968, Ser. No. 782,085
Int. Cl. B07c *3/10*
U.S. Cl. 209—80.5 **6 Claims**



A sorting machine having a support frame vibrated by a vibrator mounted therebeneath. A sliding selector that is easily moved along the lowermost edge of edge-notched data cards is positioned to rest on the support frame and is actuable to present a raised knife-edge surface past which correspondingly notched cards will drop. The support frame is mounted to vibrate independently of the housing and a compression adjustment plate is provided to hold a deck of data cards under proper compression for efficient sorting.

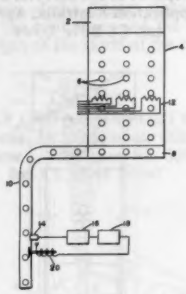
3,587,854
SIZING MACHINE FOR POTATOES AND THE LIKE
Scott W. Brown, and Owen K. Ward, Pocatello, Idaho, assignors to Milestone, Inc., Pocatello, Idaho
Filed Oct. 21, 1968, Ser. No. 769,022
Int. Cl. B07b *13/00*
U.S. Cl. 209—102 **13 Claims**



A sizing machine for potatoes and similar items wherein a series of narrow, elongate conveyors are arranged in mutually spaced, side-by-side parallel relationship to define a conveying and sizing deck for items deposited thereon. The individual conveyors are mounted and mechanism is provided for simultaneously expanding or contracting the screening spaces therebetween to vary screen size. The conveying and sizing deck is advantageously formed by the upper runs of endless conveyor belts of special sprocket-chain formation.

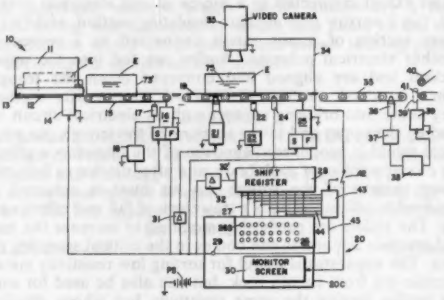
3,587,855
HEAT MARKING AND SENSING FOR BOTTLE REJECTION
Gerald L. Roy, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.
Filed Nov. 29, 1968, Ser. No. 779,813
Int. Cl. B07c *5/344*
U.S. Cl. 209—111.5 **3 Claims**

A defective article rejection apparatus for use with glass container manufacturing equipment using plural molds. Defective articles coming from the molds are marked by being heated with a selectively controlled heater. At some part further down the assembly line, when the glass containers are



in a single line, a sensing line, a sensing probe will detect the heated bottles and actuate a reject mechanism which will knock the defective glass containers off the conveyor line.

3,587,856
CODING AND ROUTING APPARATUS AND METHOD
Jerome H. Lemelson, 85 Rector St., Metuchen, N.J.
Filed Sept. 5, 1967, Ser. No. 665,526
Int. Cl. B07c *5/342, 5/344*
U.S. Cl. 209—111.7 **18 Claims**



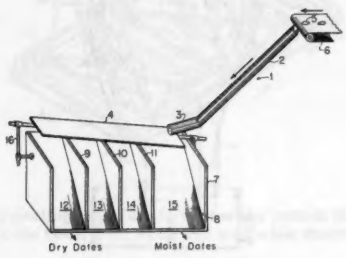
An apparatus and method for coding and distributing articles such as mail pieces is provided which is subject to semiautomatic or automatic operation. In one form of the invention, flat articles such as envelopes and cards are fed, one at a time by selection means, from a supply or stack thereof, to a reading station. An operator, after reading the identification means such as the address on the face of each card or envelope, operates a bank of pushbutton switches or other means for applying a destination code to an edge area of the mail piece. The apparatus may also include means for applying erasable recording material such as magnetic recording material as a tape or film to a predetermined area of each mail piece either with the code defining the mail piece or its destination recorded on said applied material or to be recorded thereon after it is applied.

In another system, alphanumeric characters printed on the face of the mail piece or a label applied thereto are automatically read by a document character scanner which provides a code output signal which is used to modulate a means for recording characters or codes along a predetermined band area of the mail piece.

The apparatus also includes improvements in the structures of the conveying, scanning and coding equipment utilized therein.

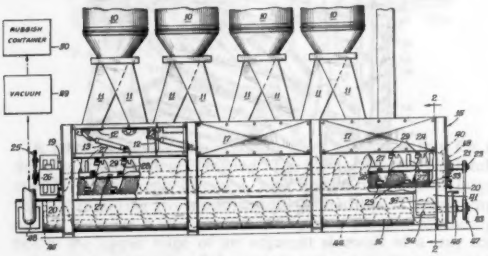
Means for modifying the apparatus for coding and scanning packages other than flat envelopes or cards are also provided.

3,587,857
DEVICE FOR SORTING FRUIT
David Reznik, Berkeley, Calif., assignor to The United States of America, as represented by the Secretary of Agriculture
Filed Nov. 14, 1968, Ser. No. 775,666
Int. Cl. B07b *13/10*
U.S. Cl. 209—119 5 Claims



Apparatus and process are disclosed for sorting fruit—typically dates—according to the moisture content of the individual units in the batch. The dates are accelerated by sliding down a chute, and then projected against a surface whereby they rebound to a degree responsive to their softness which, in turn, is related to their moisture content.

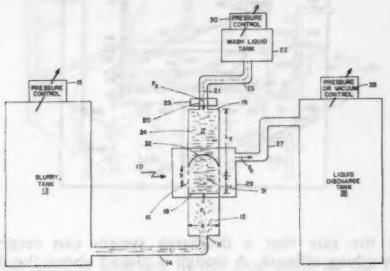
3,587,858
FIBER HANDLING AND CLEANING DEVICE
Lynn M. Christianson, 44 Hawthorne Road, Barrington, Ill.
Continuation of application Ser. No. 743,818, July 10, 1968, now abandoned. This application Nov. 4, 1969, Ser. No. 871,659
Int. Cl. B07b *1/42*
U.S. Cl. 209—257 13 Claims



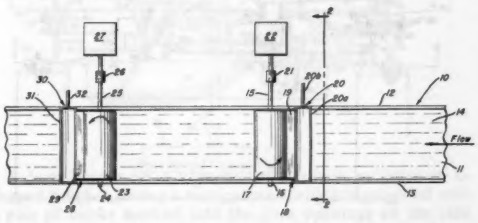
A mixture of textile fibers, dirt, dust, etc. is dropped into a cleaning conveyor which comprises a helical flight mounted on a shaft and positioned over a perforate bottom. Brushes on the flight contact the perforate bottom. At the end of the cleaning conveyor the cleaned fibers are picked up by vacuum. Below the perforate bottom is a second screw conveyor moving the material that goes through the screen in the opposite direction. This material is picked up at the far end of the second conveyor by a vacuum which also serves the purpose of applying a subatmospheric pressure below the perforate bottom.

3,587,859
METHOD OF SEPARATING SOLID PARTICLES FROM A SLURRY WITH WASH COLUMN SEPARATORS
Ronald F. Probstein, 53 Jordan Road, Brookline, Mass., and Josef Shwartz, Cambridge, Mass. (49 Einstein St., Haifa, Israel)
Filed July 30, 1968, Ser. No. 748,811
Int. Cl. B01d *37/04*
U.S. Cl. 210—66 6 Claims

An apparatus and method for removing solid particles, such as ice crystals, from a mixture of said particles in a liquid medium, such as brine, wherein a wash column separator is used to form a porous bed of said particles and the liquid medium is caused to flow outwardly from the column at a screened opening positioned intermediate its ends. A wash liquid is introduced at one end of the column to displace the liquid medium from the interstices between the particles as the porous bed moves through the column. Control means are provided to control the relationship among the pressures at the ends of the porous bed and the pressure at such screened opening so as to maximize the rate at which the particles can be removed at the output end of the column.



3,587,860
METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM WATER
Herman E. Ries, Jr., Chicago, Ill., and Joseph Gabor, Hammond, Ind., assignors to Standard Oil Company, Chicago, Ill.
Continuation of application Ser. No. 678,871, Oct. 30, 1967, now abandoned. This application Nov. 7, 1969, Ser. No. 871,633
Int. Cl. B01d *21/00*
U.S. Cl. 210—73 4 Claims

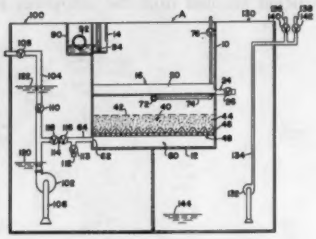


A plurality of counterrotating drums in series to remove materials floating on water and materials dispersed immediately below the surface of the water, a first drum partially immersed having a surface of organophilic material, the drum rotating in the direction of flow of the water removes heavy viscous contaminant materials. Another drum immersed more deeply and located downstream from the first drum has a hydrophilic surface material and the drum rotates against the flow of water to remove light oily contaminant material. Scraper means clean the contaminants from the surfaces of the drums and contaminant removal means remove the contaminants from the system.

3,587,861
APPARATUS AND METHOD OF FILTERING SOLIDS FROM A LIQUID EFFLUENT
David S. Ross, Lorain, Ohio, assignor to Hydro-Clear Corporation, Avon Lake, Ohio
Division of Ser. No. 633,458, April 25, 1967, Patent No. 3,459,302. Filed June 11, 1969, Ser. No. 832,407
1969, Ser. No. 832,407
Int. Cl. B01d *23/24*
U.S. Cl. 210—277 3 Claims

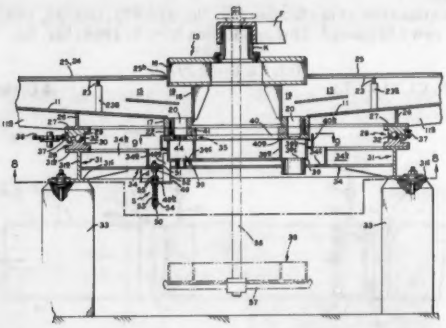
An apparatus and method of filtering solids from a liquid effluent wherein a sand filter having a single grade granular

media is used having agitation of the effluent above the filter media surface at a rate to lift solids from the media surface and means for periodically backwashing clear effluents through the filter at a controlled rate which is not dependent



upon the rate that a discharge system can receive the backwashing effluent. A trough is placed above the filter to accept the backwash effluent upon its passing through the filter in the reverse direction.

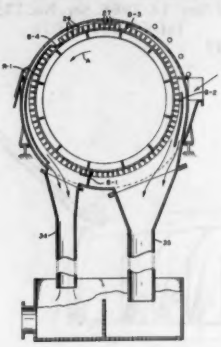
3,587,862
ROTARY TABLE FILTER APPARATUS
Graham Lee, Stamford, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.
Continuation of application Ser. No. 532,988, Mar. 9, 1966, now abandoned. This application July 24, 1969, Ser. No. 871,724
Int. Cl. B01d *35/12, 33/24*
U.S. Cl. 210—330 **8 Claims**



A rotary table filter wherein the stationary annular valve member is surrounded by an annular support construction having an annular base member supporting the annular track bearing for the filter table, an annular shelf member surrounding the annular valve member, and radial spider arms rigidly connecting said annular base member with said annular shelf member, with access to the inner and the outer peripheries of the cooperating annular valve faces.

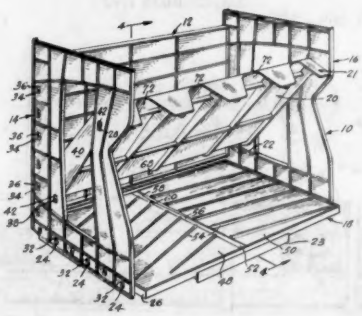
3,587,863
ROTARY DRUM FILTER
Ferdinand Kristofl, Orillia, Ontario, Canada, assignor to Dorr-Oliver Incorporated, Stamford, Conn.
Continuation of application Ser. No. 611,077, Jan. 23, 1967, now abandoned. This application Sept. 16, 1969, Ser. No. 863,669
Int. Cl. B01d *33/06*
U.S. Cl. 210—404 **31 Claims**

In such a filter, as the drum rotates, a layer or sheet of pulp material collected from the bath upon the filter media of the drum, emerges at the ascending side of the drum. Feed suspension or pulp is supplied continuously to the vat, so that the sheet may be delivered continuously at the descending side of the filter drum, while separated filtrate liquid passes continuously from the drum. A cake-washing phase and subsequent cake-drying phase may be interposed between the



points of cake emergence and cake discharge, at the top side of the filter drum.

3,587,864
BOOT RACK
Henri Delisle, 7895 Ave. Doncet, Quebec 7, Quebec, Canada
Filed Feb. 4, 1970, Ser. No. 8,538
Claims priority, application Canada, Feb. 22, 1969, 070,624
Int. Cl. A47f *7/08*
U.S. Cl. 211—37 **8 Claims**

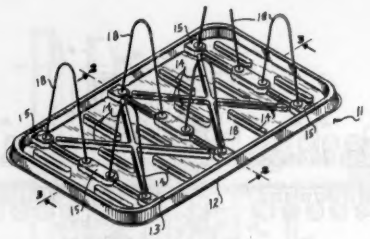


A rack for dripping overshoes, boots or the like consisting of a housing having a boot-receiving base panel and an inclined overshoe-receiving panel extending above the base panel and fixed to the opposite sidewalls of the housing. The inclined panel is provided with a trough-shaped lower end for collecting the water; a hole extends through the lower end for discharging the water into draining means provided on the base panel. A water-receiving tray is mounted underneath the bottom wall for collecting the water received through an orifice provided in the base panel. The housing is structured so that a plurality of racks may be tightly stacked together in a vertical relation as well as in a lateral relation to form a compartmented rack structure.

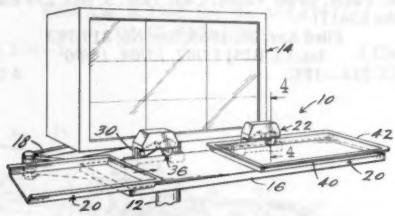
3,587,865
BOOT AND OVERSHOE CADDY
Harold E. Phillips, Hopkins, Minn., assignor to St. Paul Brass Foundry Company, St. Paul, Minn.
Filed Apr. 15, 1970, Ser. No. 028,596
Int. Cl. A47f *7/08*
U.S. Cl. 211—37 **6 Claims**

A caddy for drying boots, overshoes and the like is disclosed which consists of a rectangular tray carrying a plurali-

ty of removable wicket-shaped boot-carrying members. Upwardly projecting ridges are formed in the bottom of the tray to elevate the boots from water and mud while draining.



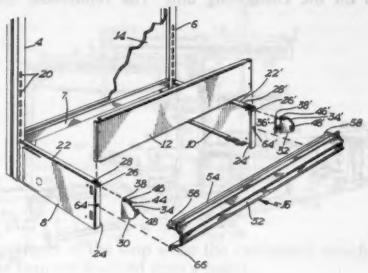
3,587,866
LATCHING DEVICE FOR FOOD TRAYS
Angelo Boudouris, Sylvania, Ohio, assignor to Eprad Incorporated, Toledo, Ohio
Filed May 22, 1969, Ser. No. 826,811
Int. Cl. A47f *3/14*; **E05b** *47/00, 73/00*
U.S. Cl. 211—133 **11 Claims**



A latching device for inhibiting theft of a food tray for a drive-in restaurant is provided. The device includes a latch member which can be used with conventional food trays without requiring any modifications of the trays. The latching device includes a latch member having a portion extending below the upper edge of an adjacent sidewall of a tray for preventing removable of the tray in at least on direction and retaining means adjacent the latch member permitting the tray to be moved thereunder for engagement by the latch member. The latching device also is relatively simple to install on a food tray support.

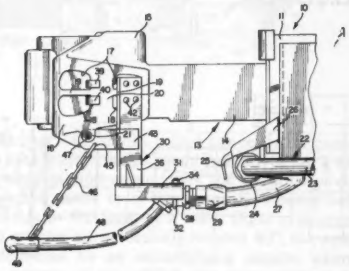
3,587,867
BASE NOSE HOOK LOCK FOR DISPLAY STANDS
Jay G. Fenwick, Albert Lea, Minn., assignor to Streater Industries, Inc., Albert Lea, Minn.
Filed July 18, 1969, Ser. No. 843,024
Int. Cl. A47f *5/00*
U.S. Cl. 211—183 **3 Claims**

The invention relates to a display stand of a type commonly found in department stores and which has two general forms known as wall cases and gondolas. This type of display stand has a base or platform having a height of about 6 or 8 inches from the floor. The base customarily has a base nose which has the general form of a longitudinally extending, rounded-off protrusion extending from the upper portion of the base and forming a toe space therebeneath. The invention is directed to a specific construction for the base nose and its attachment to the base, wherein a pair of generally semicircular shaped brackets are attached by hook means to vertical flanges on spaced apart base arms, and a nose shell having a cross-sectional shape corresponding to the shape of the brackets is mounted in engagement with the brackets.



The nose shell is attached to the base arms by tab means received in slots in horizontal flanges on the base arms.

3,587,868
HOSE HANGER ARRANGEMENT FOR RAILWAY CAR TRAINLINE
Donald B. Yates, Park Forest, Ill., assignor to Pullman Incorporated, Chicago, Ill.
Filed Oct. 17, 1969, Ser. No. 867,293
Int. Cl. B61g *5/06*
U.S. Cl. 213—1 **7 Claims**

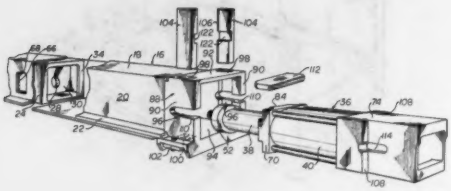


A hose hanger for a trainline arrangement includes an L-shaped bracket having a vertical mast which is provided with a pair of hooks hooked into the core openings on the side face of a standard type E coupler. The mast includes a bracket which removably secures the hanger arrangement to the coupler. A horizontal channel-shaped base member is connected to the mast and removably supports an elbow connection which has connected thereto a flexible hose extending to an angle cock arrangement. The angle cock arrangement is supported on the end sill of the car and communicates with a trainline conduit extending the length of the car. A second flexible hose from the elbow and having a glad hand connected thereto extends forwardly and includes a chain arrangement supporting the latter hose from the hanger bracket arrangement. The car includes an end-of-car cushioning unit and swinging and longitudinal movement of the coupler is facilitated by means of the hanger arrangement.

3,587,869
END-OF-CAR CUSHIONING MECHANISM
Eulas R. Atkinson, Conroe, and R. Gordon Powell, Houston, Tex., assignors to ACF Industries, Incorporated, New York, N.Y.
Filed Apr. 28, 1969, Ser. No. 819,604
Int. Cl. B61g *9/04, 9/12*
U.S. Cl. 213—8 **14 Claims**

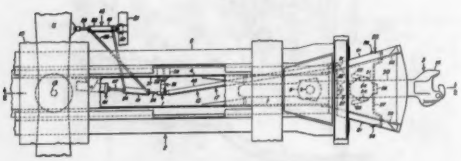
A railway car having an open-ended sill through which buff and draft forces are transmitted to the car and including a

buff- and force-cushioning unit which is capable of being installed and removed from the end of the sill. The sill includes a connector structure which retains a pair of removable draft lugs in position for draft contact with draft stop shoulders formed on the cushioning unit. The removable draft lugs



cooperate with the draft stop shoulders to achieve positive centering of the cushioning unit within the sill and also to serve as retaining means for a coupler key establishing connection between the cushioning unit and a railway car coupler.

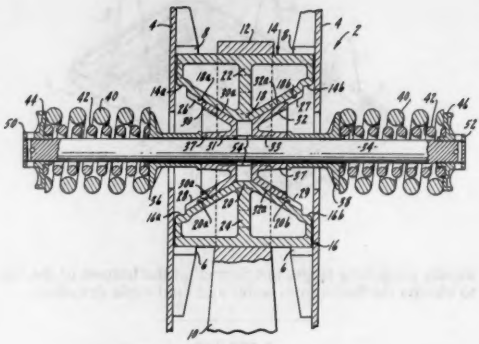
3,587,870
AUTOMATIC HYDRAULIC-MECHANICAL COUPLER POSITIONING DEVICE
Geoffrey W. Cope, Williamsville, N.Y., assignor to Dresser Industries, Inc., Dallas, Tex.
Filed Feb. 6, 1968, Ser. No. 703,374
Int. Cl. B61g *5/00, 7/12*
U.S. Cl. 213—15 **10 Claims**



A device providing a hydraulic-mechanical operative connection between a railway coupler mounted for horizontal swinging in a floating sill or a cushion underframe car and an adjoining truck for automatically positioning the coupler when uncoupled relative to underlying track, for coupling with a mating coupler the device being both automatically overridable by and disengageable from the coupler to permit the coupler respectively to swing when coupled with a mating coupler and to be swung when uncoupled to a nonautomatic position.

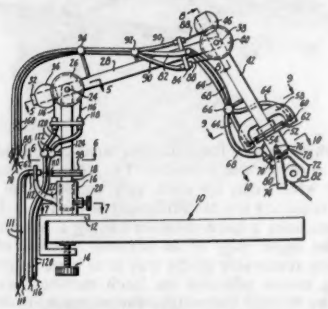
3,587,871
DRAFT GEAR
Bertil E. Peterson, Chicago, Ill., assignor to Cardwell Westinghouse Company
Filed Jan. 29, 1969, Ser. No. 794,926
Int. Cl. B61g *9/10*
U.S. Cl. 213—38 **6 Claims**

A draft gear having opposed followers being unitarily formed with central wedging sections, each having at least two inclined flat surfaces disposed in diverging relationship with respect to one another. A pair of alignment ridges or track formers are provided on each of the inclined surfaces so as to provide a specific friction pathway for the movement of friction shoes or wedge elements thereon. The wedging sections have dropoffs or are relieved at the ends thereof so that abutment shoulders will not be formed during wear of the inclined surfaces by the friction shoes or elements. The materials used in constructing the gear are of high quality steel and the wedging elements or shoes in conjunction with the remainder of the components, having working or contacting engagements, are contoured so as to allow for easy



passing of the moving members, thereby reducing undesired frictional engaging contacts.

3,587,872
MECHANICAL ARM AND CONTROL MEANS THEREFOR
Paul E. Pauly, Grass Valley, Calif. (Rte. 3, Box 239 Emmett, Idaho 83617)
Filed Apr. 28, 1969, Ser. No. 819,783
Int. Cl. B25j *13/02, 13/04, 15/00*
U.S. Cl. 214—1BC **4 Claims**

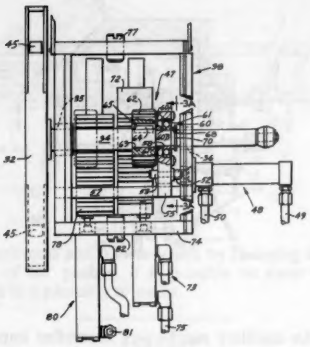


A mechanical arm is provided with a free end having gripping jaws thereon, and a pair of foot pedals are connected by Bowden wires to the various elements to control swinging movement of the elements of the arm both vertically and horizontally and controlling opening and closing movements of the jaw members.

3,587,873
TOOL CHANGE MECHANISM FOR A MACHINE TOOL
Earl R. Lohneis, Milwaukee, Wis., assignor to Kearney & Trecker Corporation, West Allis, Wis.
Filed May 15, 1969, Ser. No. 824,793
Int. Cl. B23q *5/32*
U.S. Cl. 214—1BD **4 Claims**

A tool changer mechanism which is operable to effect an interchange of tools between a machine tool spindle and a tool storage magazine. A tool change arm is connected to a shaft on which there is secured a gear member. The gear member and a plurality of racks are actuatable by hydraulic

actuators to impart the necessary rotational movement to the tool change arm and another hydraulic actuator is actuatable



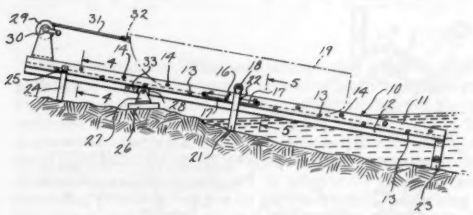
to effect the necessary translational movement to the tool change arm for effecting a tool interchange.

3,587,874

BOAT-SUPPORTING AND LAUNCHING DEVICE

Edwin H. Graf, W187-S6876 Jewel Crest Drive, Muskego, Wis.

Filed Aug. 8, 1969, Ser. No. 848,639
Int. Cl. B63c *3/02*
U.S. Cl. 214—1-A **3 Claims**



A ramp is positioned on a shore with one end in the water, and has a winch on its shore end, the support being furnished by a footing member resting on the shore and having spaced-apart upwardly projecting roller assemblies. The frame of the ramp comprises spaced outer longitudinals having lower surfaces which engage on the spaced rollers, there being a center longitudinal which projects below the outer longitudinals to fit between the rollers, and there being boat keel supporting rollers between the outer longitudinals and over the upper edge of the center longitudinal. There are also longitudinally projecting hull-guiding rollers intermediate the length of the ramp.

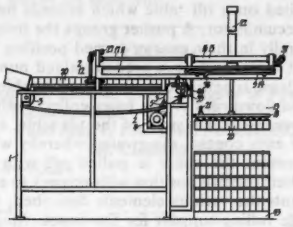
3,587,875

APPARATUS FOR PALLETIZING CANS, JARS, BOTTLES OR OTHER CONTAINERS

Joseph Thomas Carmody, 100 Balaclava Road, Shepparton, Victoria, Australia

Filed Oct. 17, 1968, Ser. No. 768,341
Int. Cl. B65g *57/04*
U.S. Cl. 214—6 **5 Claims**

Apparatus for palletizing cans or similar containers in which the containers are marshalled against a releasable stop and in which an accumulation of such containers are gripped by such means and first moved horizontally while the stop is released and subsequently thereto the stop is again restored to its active position to assure a new accumulation of containers upstream of the stop while the containers which have passed the stop are lowered onto a pallet.

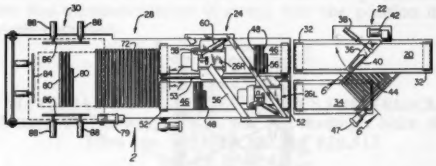


3,587,876

PALLET-LOADING APPARATUS

Billy J. Dahlem, Golden, and John A. Martin, Denver, Colo., assignors to Power-Curve Conveyor Company, Denver, Colo.

Filed Nov. 25, 1968, Ser. No. 778,591
Int. Cl. B65g *57/22*
U.S. Cl. 214—6 **16 Claims**



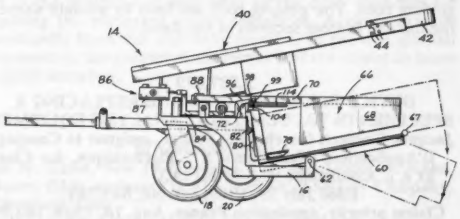
Pallet loader characterized by a feed conveyor for continuously moving articles in axially spaced relation along a single path to a diverter station where they are thence conveyed along two parallel paths to a continuously moving article orientation station in the form of a roller flight conveyor on which desired articles are selectively rotated 90°, the articles then being delivered to an accumulator station where a desired layer pattern is assembled, the layer pattern then being delivered to a loading station where it is compacted to uniform dimensions and thence delivered to a pallet elevator on which the layer patterns are successively stacked to desired height.

3,587,877

BALE ACCUMULATOR AND DISCHARGER

Robert E. Hornibrook, Star Route 303, Box 6, Goldendale, Wash.

Filed Mar. 5, 1969, Ser. No. 804,441
Int. Cl. B65g *57/32*
U.S. Cl. 214—7 **3 Claims**



Apparatus for accumulating a multiplicity of bales coming from a traveling baler, with the bales aligned side by side.

The apparatus operates, on a predetermined number of bales being accumulated, to dump such on the ground. The apparatus includes a chute receiving bales coming from the baler and operable to turn each a quarter turn before the bale is deposited on a tilt table which extends between the sides of the accumulator. A pusher groups the bales by shifting them laterally in their quarter-turned position toward an end of the tilt table, and on a predetermined number being collected a release is actuated causing the tilt table to incline rearwardly and downwardly. The bales collect with rear ends protruding over the rear margin of the tilt table, and on tilting these rear ends contact the ground whereby with further forward movement the stack is pulled off with the bales maintaining their relative position with respect to each other. A frame mounts the various elements described, and caster wheels provide rolling support for the frame. Means is provided for connecting the accumulator to a traveling baler which maintains an axis extending from front to rear in the accumulator in a predetermined position with respect to a similar axis in a baler on the baler making a turn.

3,587,878

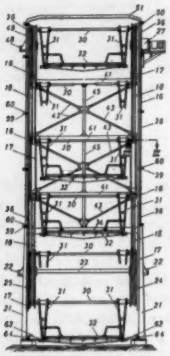
SECTIONAL COMPONENT ENDLESS PARKING ELEVATOR

Lennart Strandberg, and Maj Strandberg, Gullanget, Sweden, assignors to Autolift Garage AB, Oskarshamn, Sweden

Continuation-in-part of application Ser. No. 511,838, Dec. 6, 1965. This application Mar. 24, 1969, Ser. No. 809,835

Int. Cl. E04h *6/06*

U.S. Cl. 214—16.1 **6 Claims**



A parking elevator wherein platforms for the cars are circulated on an endless belt to different heights. The height of the elevator may be increased by intermediate sections located between a bottom section and a top section. Each of the elevator cages is provided with a horizontal shaft which link chains carry over the upper and lower sprockets. The intermediate sections have posts of a multiple of the length of half the length of one of the chain links and the posts are also provided with guiding taps for engaging a flange on a succeeding section of the elevator. The sprocket wheels carry guiding rollers and the guiding rollers run in grooves between guiding rods. The guiding rods are bent to arcuate shape in the top and bottom sections of the stand.

3,587,879

DEVICE FOR DISPLACING AND REPLACING A SPECIMEN IN VACUUM-TIGHT ANALYSIS EQUIPMENT

Jacques Guernet, Courbevoie, France, assignor to Compagnie D'Applications Mecaniques A L'Electronique, Au Cinema Et A L'Atomistique (C.A.M.E.C.A.)

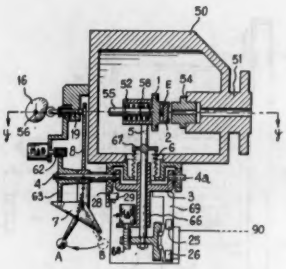
Filed July 29, 1969, Ser. No. 845,769

Claims priority, application France, Aug. 14, 1968, 162,990

Int. Cl. H01j *31/26*

U.S. Cl. 214—17 **2 Claims**

In a vacuumtight analysis equipment, the mechanism used for varying the position of the stage with a view to varying the analyzed portion of the system also makes it possible to position this stage opposite the internal opening through which the specimen chamber communicates with the air-lock



chamber. An auxiliary mechanism thereafter imparts to the stage a translation movement at the end of which this internal aperture is obturated by the stage after a specimen fixed thereto has penetrated into the air-lock chamber.

3,587,880

APPARATUS FOR CHARGING A FURNACE

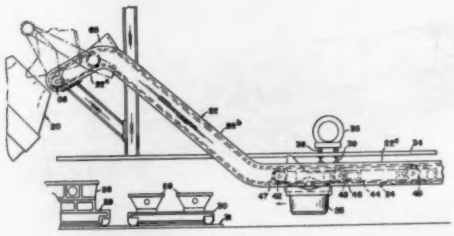
Klaus W. Forster, Brecksville, and Donald W. Schaper, Alliance, Ohio, assignors to Kerma Corporation, Alliance, Ohio

Division of Ser. No. 671,784, Sept. 29, 1967, Pat. No. 3,497,890

Filed June 5, 1969, Ser. No. 847,767

Int. Cl. B66c *17/08;* **E01b** *25/22;* **B61d** *15/12*

U.S. Cl. 214—19 **3 Claims**



An articulated carriage with tandem sections is supported and guided by a track for movement to a location above a steel-making furnace, preferably of the basic oxygen type. A forward carriage section carries a charge container and a following carriage section drives the carriage along the track. Forward movement of the front section is stopped above the furnace and continued movement of the trailing section jackknife the carriage, tilting the front section and charge container forward. A portion of the track above the furnace is angularly inclined downwardly relative to a preceding portion of the track to initiate tilting of the front section of the carriage.

3,587,881

GLASS FURNACE CHARGER

Arthur E. Kurtz, New Providence, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

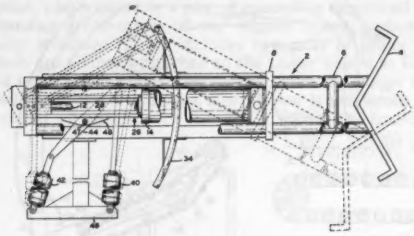
Filed Oct. 28, 1968, Ser. No. 770,988

Int. Cl. B65g *25/10*

U.S. Cl. 214—33 **1 Claim**

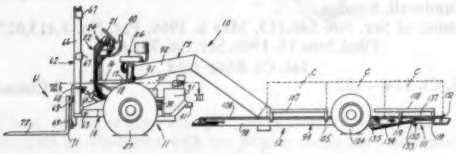
An apparatus for introducing batch materials across the surface of the molten glass in a glass tank furnace. A reciprocating arm is used to push the batch material from the area in which it is dropped in the furnace out across the surface of the molten glass. The reciprocating arm or pusher is

pivotally mounted so that it may push the batch material in a plurality of directions. The pusher moves in a reciprocating



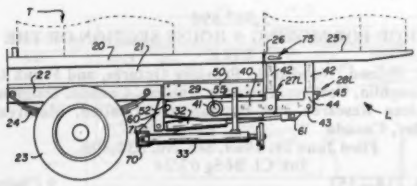
manner backward and forward, and by changing the longitudinal axis of the pusher, it is possible to have the pusher reciprocate in a plurality of paths.

3,587,882
LIFTING AND TRANSPORTING APPARATUS
Philip L. Friday, and David G. Friday, R.R. #2, Hartford Township, Van Buren County, Mich.
Filed July 2, 1969, Ser. No. 838,418
Int. Cl. B60p *1/44*
U.S. Cl. 214—75 **11 Claims**



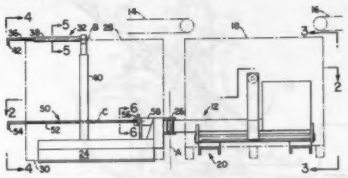
An apparatus for lifting and transporting objects, such as pallet-type fruit boxes and/or industrial parts bins, comprising a steerable tractor unit having a forklift mechanism mounted thereon. A trailer unit having a load-receiving bed is coupled to the tractor unit to permit relative pivotal movement therebetween about a vertical axis whereby the forklift mechanism can be positioned in sidewardly or frontwardly extending positions relative to the trailer unit for picking up the objects and can be pivoted to a position over the bed of the trailer unit for depositing the objects thereon.

3,587,883
BALE STACK LOADER FOR TRUCKS
Allan B. Neely, Jr., P.O. Box X, Limon, Colo. 80828
Filed Jan. 24, 1969, Ser. No. 793,834
Int. Cl. B60p *1/48*
U.S. Cl. 214—77 **6 Claims**



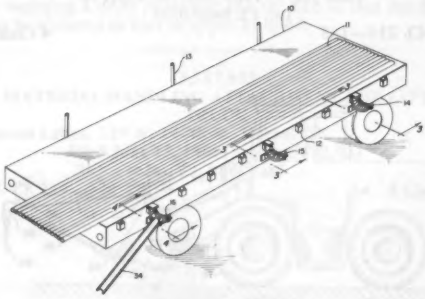
A platform elevator for a flat bed truck adapted to be raised to the level of the truck bed and lowered to the ground. The elevator is especially adapted for handling stacks of hay bales and the like and is combined with pushers carried underneath the truck adapted to facilitate pushing a bale stack off the platform after it is lowered onto the ground. To facilitate this pushing-off operation, the platform is adapted to be moved forwardly underneath the truck bed against the pushers while the pushers are adapted to move rearwardly across the platform.

3,587,884
CRATE-HOLDER
Philip R. Adrian, Escalon, Calif., assignor to Fruit Harvesting Co., Inc., Escalon, Calif.
Filed May 1, 1969, Ser. No. 820,893
Int. Cl. B60p *3/00*
U.S. Cl. 214—83.24 **3 Claims**



A crate is carried on a pivotable support frame attached to a harvesting machine, while another crate mounted on the harvesting machine receives fruit or the like being harvested thereby. Means are included for selectively holding the first-mentioned crate on the support frame and out of the way of the second-mentioned crate. When the second-mentioned crate is filled, it is released from the harvesting machine and the first-mentioned crate is swung into the position it formerly occupied.

3,587,885
MATERIAL HANDLING APPARATUS FOR VEHICLES
Howard D. Hanway, 613 W. 6th St., Hastings, Nebr. 68901
Filed Apr. 30, 1969, Ser. No. 820,512
Int. Cl. B60p *1/52*
U.S. Cl. 214—84 **9 Claims**

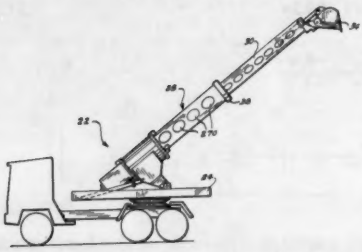


An apparatus for unloading elongated objects from a vehicle. Dolly members are attached to a load carrying surface of the vehicle, the dolly members being in alignment with each other and having object supporting elements such as rollers or the like, located generally below the level of the surface and permitting substantially frictionless movement of the object in the direction of alignment of the dolly members for removing the elongated object therefrom. A chute extends downwardly from the end dolly member to provide gradual movement to the ground of the last end of the object to leave the dolly members.

3,587,886
BOOM ASSEMBLY
John W. Gano, New Philadelphia, Pa., and Lester H. Kline, Dover, Ohio, assignors to The Warner & Swasey Company, Cleveland, Ohio
Filed Feb. 14, 1969, Ser. No. 799,429
Int. Cl. E02f *9/14*
U.S. Cl. 214—141 **15 Claims**

An improved boom assembly includes relatively movable inner and outer sections mounted in a telescopic relationship

with each other. A first group of guide rollers is mounted on the outer end of the outer section of the boom assembly and is positioned for rolling engagement with corner portions of the inner section of the boom assembly. A second group of guide rollers is mounted on the inner end of the inner section of the boom assembly and is positioned for rolling engagement with corner portions of the outer section of the boom assembly. Each roller of these groups of rollers is adjustable



both axially and radially relative to the section of the boom assembly which it engages. This enables the rollers to be adjusted to eliminate side loading and to provide for proper tracking or rolling of the rollers along the corner portions of the engaged sections. The rollers are advantageously mounted on brackets which are constructed so as to enable the rollers to be readily mounted on the boom assembly and interchanged with each other.

3,587,887

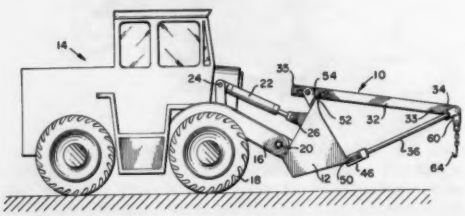
BUCKET LOADER ATTACHMENT

John P. De Carli 988 Garden Road, Orange, Conn. 06477

Filed July 3, 1969, Ser. No. 838,774

Int. Cl. B66f *9/00*

U.S. Cl. 214—145 **4 Claims**



An attachment for bucket loaders which provides means for quickly and easily mounting it on a bucket loader so that this type of machine can be used for lifting heavy objects to higher places and lowering them into deeper ditches below ground than such machines are presently capable of doing. The attachment consists of a three-legged boom with slotted portions on the ends of two of the legs into which fit the cutting edge of the bucket of the machine. The third leg is rigidly fastened to the back edge of the bucket by any suitable fastening means such as a bolt.

3,587,888

TRANSFERRING HORIZONTAL BATCHES OF ARTICLES TO A DIFFERENT LEVEL

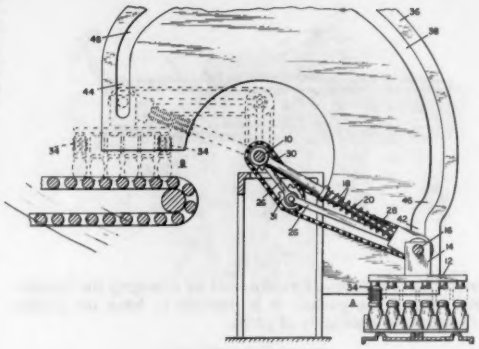
William H. Warren, Pleasant St., West Brookfield, Mass. 01585

Filed Mar. 3, 1969, Ser. No. 803,709

Int. Cl. B66c *23/00*

U.S. Cl. 214—146.5 **6 Claims**

Means picking up vertically a plurality of articles in a horizontal formation and transferring them in a batch to a



different level while still horizontal and depositing the articles vertically.

3,587,889

METHOD AND APPARATUS FOR HANDLING A LOAD

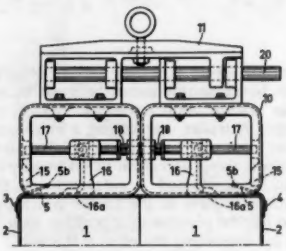
Karl Gunnar Bohlin; Carl-Erik Gustafsson; Per Albin Strombeck, Sundsvall, and Stig Arthur Johnsson, Tuna Dalsuerken, Sweden, assignors to Svenska Cellulosa Aktiebolaget, Sundsvall, Sweden

Division of Ser. No. 548,113, May 6, 1966, Pat. No. 3,413,027

Filed June 11, 1968, Ser. No. 751,643

Int. Cl. B66c *1/18*

U.S. Cl. 214—152 **2 Claims**



A method for handling loads comprising the steps of substantially enclosing the load with a bandlike packaging material having at least one vertically directed loop, connecting force-transmitting elements to opposite sides of the load adjacent the upper surface thereof, and applying lifting forces to these elements.

3,587,890

METHOD FOR MOVING A HOUSE SECTION OR THE LIKE

John E. Hyland, Woodstock, Province Ontario, and Frank C. McLaughlin, Toronto, Province Ontario, Canada, assignors to Alcan Research and Development Limited, Montreal, Quebec, Canada

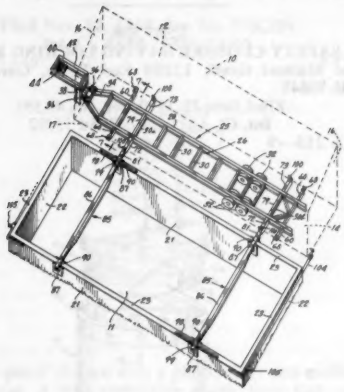
Filed June 11, 1969, Ser. No. 832,308

Int. Cl. B65g *67/24*

U.S. Cl. 214—152 **9 Claims**

A trailer for moving a preassembled house section to a foundation, including a pair of longitudinal beams and two pairs of removable load-supporting wings extending outwardly from the beams adjacent to the front and rear of the trailer, respectively, each wing having a threaded bolt projecting upwardly to engage the base frame of the house section. For transport of the house section, the bolts are turned to effect vertical separation of the wings and base frame,

causing the beam ends to bend downwardly until the house section rests on and is stably supported by the central portions of the beams. Upon arrival at the foundation site, the trailer is positioned to align the house section with the foundation, which supports a pair of removable horizontal tracks extending transversely of the aligned house section. The trailer structure further includes two pairs of lifting wings, which are pivotally attached to the trailer beams at forward and rearward localities, respectively, after the trailer is thus positioned; one lifting wing of each pair is extensible and is disposed on the side of the trailer facing the foundation.



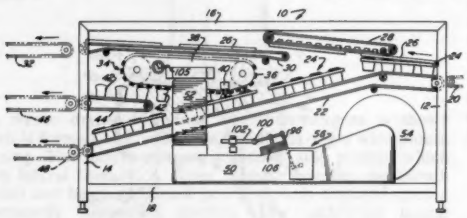
These lifting wings are pivoted upwardly until they are stopped by abutment with the beams, being then disposed in horizontal position projecting outwardly from the beams, aligned with the tracks and supporting the house section base frame. Thereafter the trailer and house section are elevated to the level of the foundation tracks by jacking up the lifting wings, the load-supporting wings being detached from the trailer; the two extensible lifting wings are extended to engage the tracks, and the house section is slid from the trailer to the foundation across the lifting wings and tracks, which are subsequently disassembled and removed from the foundation.

3,587,891

TRANSFER APPARATUS

Frank Stadelman, Cranford, N.J., assignor to Latendorf Conveying Corporation, Kenilworth, N.J.

Filed Sept. 12, 1968, Ser. No. 759,288
Int. Cl. B65g *69/00*
U.S. Cl. 214—309 **4 Claims**



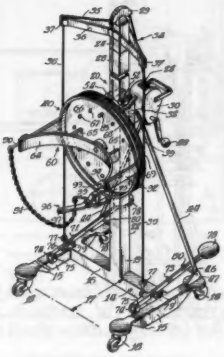
Transfer apparatus is provided with a means of maintaining the degree of vacuum in the transfer conveyor housing uniform at any desired preset value.

3,587,892

DEVICE FOR ELEVATING, AS WELL AS TIPPING OR TILTING DRUMS, BARRELS, CONTAINERS AND THE LIKE TO DUMP THE CONTENTS THEREFROM

Howard H. Vermette, No. 7—143d St., Hammond, Ind.

Filed Sept. 19, 1968, Ser. No. 760,767
Int. Cl. B65g *65/24*
U.S. Cl. 214—313 **12 Claims**



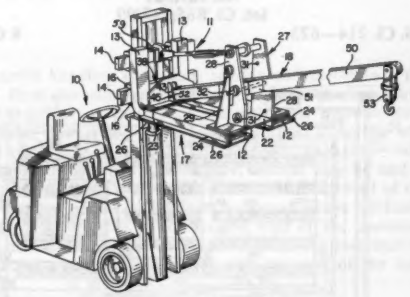
A device for elevating, as well as for tipping or tilting drums, containers and the like for dumping the contents therefrom, which device includes an upright or post supported on a base and a carriage member slidable on said upright and operated by means of a winch which raises and lowers the carriage member on said upright. The carriage member supports a rotatable member which carries means for engaging a drum container and the like so that the drum may be elevated as well as tipped or tilted.

3,587,893

MATERIAL HANDLING ATTACHMENT FOR LIFT TRUCK

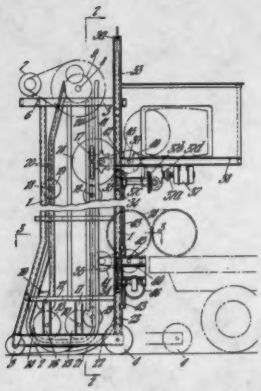
Vincent Laken, 119 W. 147th St., Harvey, Ill.

Filed June 13, 1969, Ser. No. 832,921
Int. Cl. B66f *9/18*
U.S. Cl. 214—620 **9 Claims**



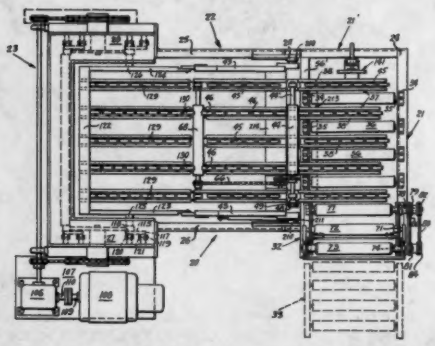
A material handling attachment for a forklift truck including a basic support assembly detachably secured on the forklift tines. This basic support assembly is constructed to be capable of mounting different types of material handling such as booms, earth moving equipment and the like without the use of special tools.

3,587,894
APPARATUS FOR RAISING, STACKING AND LOWERING BARRELS
Wallace James Parker, and William Mitchell Parker, Thornliebank Industrial Estate, Glasgow, Scotland
Filed Mar. 19, 1969, Ser. No. 808,629
Int. Cl. B65g 1/06
U.S. Cl. 214—622 6 Claims



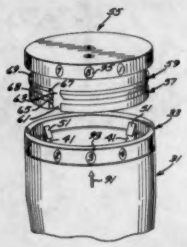
An apparatus for stacking barrels comprises a vertical tower, power-driven elevator chains within the tower and interconnected by crossmembers, a pair of sprocket chains extending vertically at the front of the tower, a vertically movable structure supported by the tower and having an outwardly extending barrel-supporting member, means by which the structure can be positioned at any desired height, a pair of inner and outer sprocket wheels carried by the structure each sprocket chain being trained over an inner and outer sprocket wheel so that they extend downwardly from the inner sprocket wheels to retain a barrel within the tower and extend upwardly from the inner sprocket wheels to permit a barrel being rolled between them onto or from the vertically adjustable supporting member.

3,587,895
MATERIAL HANDLING SYSTEM
Andrew T. Kornylak, Hamilton, Ohio, assignor to Kornylak Corporation, Hamilton, Ohio
Continuation-in-part of application Ser. No. 398,146, Sept. 8, 1964, now abandoned. This application Jan. 30, 1968, Ser. No. 709,521
Int. Cl. B65g 47/00
U.S. Cl. 214—623 8 Claims



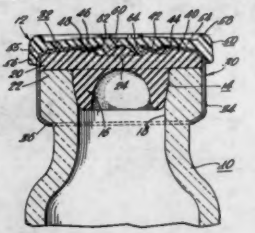
A Material Handling System comprises a horizontal conveyor and an elevator. An oscillating conveyor removes an article from the horizontal conveyor and loads it onto a carrier flight or tray on a constantly moving elevator or vertically moving flight conveyor, or receives an article from the elevator and transfers it to the horizontal conveyor. The oscillating conveyor is caused to move concomitantly with the elevator carrier in either loading or unloading direction and is automatically stopped and positioned for the next cycle of operation for loading or unloading the elevator. The articles are forwarded to the horizontal conveyor from a store or supply thereof by means of a trip mechanism operated by the oscillating conveyor at end of the oscillating path thereof under the horizontal conveyor, completing one cycle of operation. In unloading, the articles are forwarded by the oscillating conveyor to suitable receiving means.

3,587,896
SAFETY CLOSURE HAVING LOCKING RING
George Michael Graff, 13289 Earl Drive, Garden Grove, Calif. 92641
Filed June 25, 1970, Ser. No. 49,591
Int. Cl. A61j 1/00; B65d 55/02
U.S. Cl. 215—9 9 Claims



A combination closure apparatus including a container formed in its upper extremity with a circular opening having a first lug disposed adjacent thereto. A locking ring surrounds the opening and is rotatably secured to the container and is formed with a second lug. A cover is provided for covering the opening and includes a downwardly projecting neck formed with a pair of spaced apart peripheral locking flanges formed with aligned notches for passage of the lugs. Indicia is included on the container, ring and cover for indicating when the lugs are aligned with one another and the notches are in alignment with the lugs whereby the ring may be rotated with respect to the container to align the lugs and the cover may then be rotated with respect to both the ring and container to align the notches with the lugs to enable such cover to be removed.

3,587,897
CONTAINER CLOSURE
Le Roy H. Rohde, Malvern, Pa., assignor to The West Company, Phoenixville, Pa.
Filed June 25, 1969, Ser. No. 836,541
Int. Cl. B65d 41/42
U.S. Cl. 215—38 6 Claims



A container closure comprising a cap of cuplike form adapted to hold a stopper in place in a container, said cap

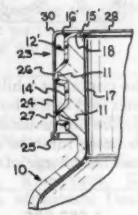
having a top including inner and outer portions, means defining a partial score in said top defining an area of reduced cross section separating said inner and outer portions, means on said outer portion for securing the cap to the container to hold the stopper or disc in place and a cover member connected to said inner portion being actuatable with respect to the outer portion to sever the top along the area of reduced cross section thereby to separate the inner portion from the outer portion.

3,587,898

TAMPER-PROOF CLOSURE WITH PLASTIC LINER

John D. Northup, Toledo, Ohio, assignor to Owens-Illinois, Inc.

Filed Nov. 22, 1968, Ser. No. 778,256
Int. Cl. B65d *23/00, 53/00*
U.S. Cl. 215—40 **9 Claims**



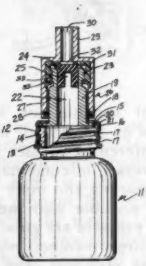
A tamper-proof closure with a plastic liner and method to fabricate same. A heat shrinkable plastic liner with an optional tamper-proof band region is shrunk about the threaded portion of a container. After the container is filled with the desired product, a metal shell is telescoped over said liner and bonded to the liner opposite the threaded area. The shell and liner are removed by rotation with the optional tamper-proof band adhering to the neck of the container.

3,587,899

FREEZE DRYING CONTAINER

Charles E. Bender, 61 Millrock Road; Taylor N. Thompson, 31 Horsenden Road, and Douglas Fraser, 12 S. Oakwood Terrace, New Paltz, N.Y.

Filed Apr. 10, 1967, Ser. No. 629,469
Int. Cl. B65d *47/14*
U.S. Cl. 215—73 **2 Claims**



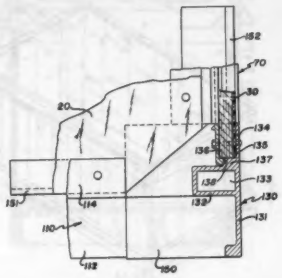
A freeze drying container for animal organs is shown which is formed of a transparent bottle having a wide mouth opening. The mouth opening carries a side portion which bears lateral threads. A cover member overlies the mouth portion and bears additional lateral threads disposed upon a downwardly depending portion. The additional lateral threads mate with the first-named lateral threads upon the side portion of the mouth opening. The cover member is provided with a narrower opening therewithin. An open tube member is formed with an outwardly extending flange which underlies the narrower opening. The tube member projects upwardly from the opening. The tube member is adapted to be connected to a vacuum pump.

3,587,900

DEMOUNTABLE CONTAINER

Alexander E. J. Millar; William W. Shaver, and Richard Mrotzek, Vancouver, British Columbia, Canada, assignors to Pacific Containers Ltd., Vancouver, British Columbia, Canada

Filed Feb. 28, 1969, Ser. No. 803,237
Int. Cl. B65d *9/34*
U.S. Cl. 217—12 **2 Claims**



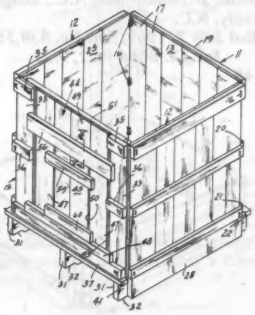
A container of fiber reinforced plastic coated panels and aluminum frame members of which the panels can be removed from the frame without breaking the frame.

3,587,901

COLLAPSIBLE MATERIALS HANDLING CONTAINER

Carl T. Flodin, Morton Grove, Ill., assignor to Bigelow-Garvey Lumber Co., Chicago, Ill.

Filed Apr. 28, 1969, Ser. No. 819,586
Int. Cl. B65d *9/18*
U.S. Cl. 217—16 **5 Claims**



Material handling container, readily collapsible to a flat folded form for storage and including four wall portions hinged together at their adjacent ends and retained to a rectangular form by a series of stakes formed integrally with at least two of the walls of the container and engageable with sockets in the base of the container. Access may be had to the interior of the container from a top or a sidewall of the container. The access means from a sidewall of the container includes nested access panels in one wall of the container nested in the wall of the container and having interlocking engagement with each other and with the wall of the container.

3,587,902

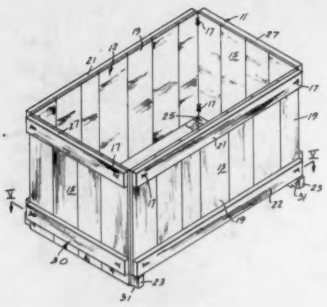
COLLAPSIBLE RE-USABLE CONTAINER

Carl T. Flodin, Morton Grove, Ill., assignor to Bigelow-Garvey Lumber Company, Chicago, Ill.

Filed Apr. 28, 1969, Ser. No. 819,646
Int. Cl. B65d *9/18, 9/22*
U.S. Cl. 217—16 **3 Claims**

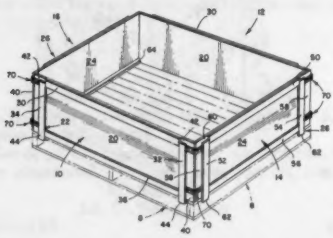
Collapsible materials handling container readily set up in the form of a rectangular container, and collapsible to a flat-

folded form. The container includes a removable bottom wall, retained to the bottom of the container without the use of fastening means. The removable bottom wall of the container fits between side and end walls of the container and is inserted from the top of the container at an angle, with one side of the bottom wall leading the other. Retainer rails extend along the insides of the end walls and have top support-



ing surfaces flush with the bottoms of the sidewalls to form supporting surfaces for the removable bottom wall of the container. The removable bottom wall of the container has at least one interlocking member extending from one side thereof and fitting under a sidewall, as the removable bottom wall is inserted in the container and moved into a flat condition, to form the bottom of the container.

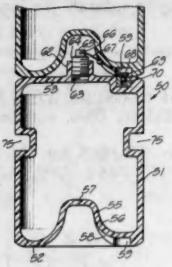
3,587,903
COLLAPSIBLE PALLET BIN
Rudolph B. Rustin, Jr., Smithfield, N.C., assignor to Overton Company, Kenly, N.C.
Filed July 2, 1969, Ser. No. 838,556
Int. Cl. B65d *9/12, 9/22*
U.S. Cl. 217—48 **10 Claims**



A collapsible pallet bin is provided for forming an open-topped container with a standard pallet. The new pallet bin comprises a pair of side sections and a pair of end sections with each of these sections including a substantially rectangular panel and a substantially rectangular frame secured to the outer surface of the panel. Hinge means are provided at each end of the sections for releasably connecting the side sections and the end sections of the assembled pallet bin. The ends of the frame are offset in a downward direction to form notches at the upper corners of the frame and downwardly projecting studs at the lower corners of the frame.

3,587,904
STACKABLE MERCURY FLASK
George W. Harris, 2012 Alpha Ave., Pasadena, Calif., and Elmer H. Good, Claremont, Calif.
Filed Oct. 28, 1968, Ser. No. 771,046
Int. Cl. B65d *21/00*
U.S. Cl. 220—3 **2 Claims**

A seamless shatterproof plastic storage and shipping container for a flask quantity of mercury designed to withstand abusive handling without risk of rupturing. The high density, high impact strength noncontaminating plastic container can be reused repeatedly. Its thick sidewalls are provided with recessed handgrips lying entirely within the confines of the exterior surface of the container, and the inwardly dished



bottom strengthens the container while permitting nesting of the top of one container within the bottom recess of another for compact stacking. The container is molded and cured at low temperature while being tumbled about intersecting axes in an oven using a measured charge of ionomer resin.

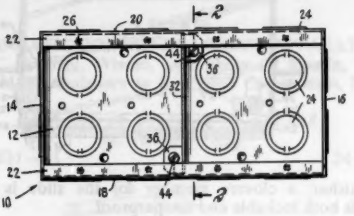
3,587,905
PRESSURE VESSEL
John McFarland, Norton-on-Tees, England, assignor to Imperial Chemical Industries Limited, London, England
Filed Nov. 29, 1968, Ser. No. 779,715
Int. Cl. B65d *7/44, 7/42*
U.S. Cl. 220—3 **8 Claims**

A pressure vessel suitable for large scale chemical processing comprises an inner shell insufficiently strong to withstand the circumferential stresses at the intended working pressure of the vessel, in combination with separate external members supporting the inner shell against circumferential stress and possible also meridional stress if the volume and working pressure are great enough to demand it. The circumferential stress members may be outside or inside the meridional stress members. For processing corrosive materials a double inner shell of corrosion-resistant metal or alloy may be used, the cavity between the two shells being vented so as to diminish or avoid contact of the corrosive materials with the stress-bearing members of the vessel.

3,587,906
ELECTRIC UTILITY BOX
William V. Pepe, Orange, Conn., assignor to ARC-CO Incorporated, Bridgeport, Conn.
Filed Apr. 25, 1969, Ser. No. 819,168
Int. Cl. H02g *3/08*
U.S. Cl. 220—3.2 **4 Claims**

A box for mounting a variety of electric utility devices in position for use, the box being adapted to be mounted in a

masonry type wall. The box is of the multiple gang type and has a dividing partition therein for separating and defining individual compartments for both high and low voltage utility

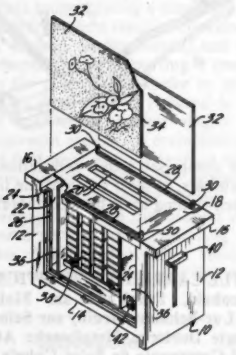


devices. The partition is confined between the undersurface of flanges extending along the top of the box and the ends of screws carried by the partition which are forcibly engaged with the bottom wall of the box.

3,587,907
BREAD TOASTER

Bunichi Okuda; Akio Nobata; Noboru Ogawa; Isamu Okabe; Yoshimasa Tsuruya, Nigga-gun, Gunma Prefecture, and Michitaka Oosuga, Kamakura, Kanagawa Prefecture, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 27, 1969, Ser. No. 811,152
Claims priority, application Japan, Mar. 27, 1968, July 9, 1968, Aug. 28, 1968, 43/24146;43/58306;43/74183
Int. Cl. G09f *7/10;* **A47j** *37/08*
U.S. Cl. 220—4 **5 Claims**



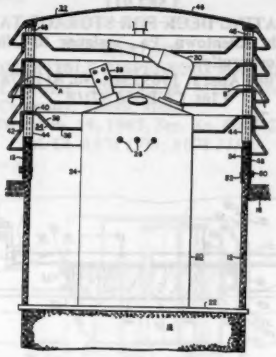
The disclosed toaster has two opposite sidewalls each formed of an ornamental panel slidable into grooves on two end walls through a slot on top or bottom wall. Two holders are disposed at both ends of each groove to hold the associated panel in the grooves. The holders are released to remove the panels from the toaster. Alternatively the two panels may slide into the grooves from below and is supported by two power holders screwed to the toaster.

3,587,908
PROTECTIVE AND COOLING COVER OR HOUSING FOR SEMIBURIED ELECTRICAL APPARATUS

Donald L. Nickel, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 21, 1969, Ser. No. 817,920
Int. Cl. F24f *7/00;* **B65d** *25/24, 7/18*
U.S. Cl. 220—4 **6 Claims**

A protective and cooling cover or housing for partially buried distribution transformers comprising a plurality of substantially identical ringlike members mounted one on the other and spaced from each other by spacing members with a top member mounted on top of the uppermost ring member. Each of the ring members has a downwardly extending outer portion for directing air into the cover or housing and also preventing rain or snow or the like from entering the cover

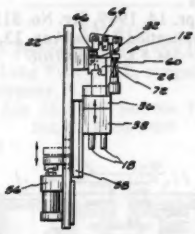


or housing and a downwardly extending inside portion for directing air downward onto an enclosed transformer and also to prevent foreign objects from being inserted into the cover or housing.

3,587,909
STUD FEEDING APPARATUS

Patrick W. Connolly, Detroit, Mich., assignor to Visi-Trol Engineering Company, Detroit, Mich.

Filed Jan. 21, 1969, Ser. No. 792,583
Int. Cl. B65h *3/44;* **G07f** *11/00*
U.S. Cl. 221—93 **8 Claims**

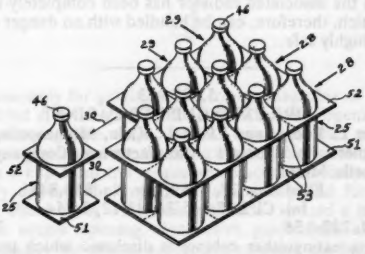


Apparatus and method for feeding a group of preoriented studs or similarly shaped articles from a common source to separated delivery stations.

3,587,910
DISPOSABLE INTEGRAL BOTTLE AND STACKING CASES

Donal Edward McCarthy, 9104 Chickawane Court, Alexandria, Va.

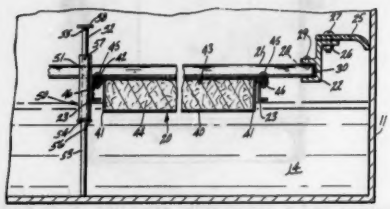
Filed Apr. 25, 1969, Ser. No. 819,343
Int. Cl. B65d *21/02, 11/04*
U.S. Cl. 220—23.4 **4 Claims**



A multiplicity of disposable plastic containers are structurally interconnected in a unitary, severable assemblage to

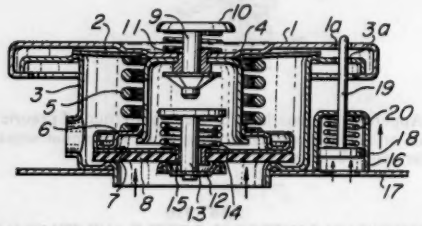
form a package from which the containers can be selectively removed by a simple manual tearing action.

3,587,911
FLOATING DECK FOR STORAGE TANK
Lou C. Creith, Allentown, Pa., assignor to Olin Mathieson Chemical Corporation
Filed Apr. 1, 1969, Ser. No. 811,878
Int. Cl. B65d *87/18*
U.S. Cl. 220—26 **7 Claims**



A floating deck for use in liquid storage tanks is provided in which a plurality of individually buoyant floats filled with a polymeric material are used to keep the deck afloat.

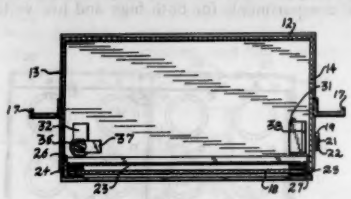
3,587,912
PRESSURE CAP UNIT WITH PRESSURE RELEASING MEANS FOR RADIATORS OF INTERNAL COMBUSTION ENGINES
Kazuhiro Ohta, Nagoya, and Kikuo Shimomura, Kariya-shi, Japan, assignors to Nippon Denso Company Limited, Kariya-shi, Japan
Filed Apr. 14, 1969, Ser. No. 815,554
Claims priority, application Japan, Aug. 23, 1968, 43/72940
Int. Cl. B65d *41/06*
U.S. Cl. 220—40 **2 Claims**



A pressure cap unit with pressure releasing means for the radiators of internal combustion engines, which is so designed that it cannot be removed unless the internal pressure of the associated radiator has been completely released and which, therefore, can be handled with no danger of scald and is highly safe.

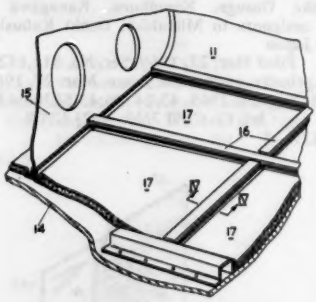
3,587,913
FIRE EXTINGUISHER CABINET
William L. Fudge, and Lloyd L. Klein, Minneapolis, Minn., assignors to Larsen's Manufacturing Company, Minneapolis, Minn.
Filed Aug. 28, 1969, Ser. No. 853,841
Int. Cl. B65d *45/28, 43/12, 25/54*
U.S. Cl. 220—55 **7 Claims**

A fire extinguisher cabinet is disclosed which includes a glass front panel that must be broken to gain access to the fire extinguisher. For periodic checking or replacement of the fire extinguisher, the glass panel is slidably removable through an elongated passage formed in the bottom of the cabinet. To prevent theft or unauthorized access to the fire



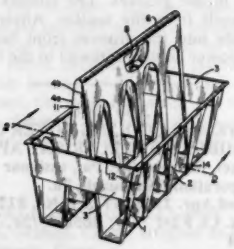
extinguisher, a closure member for the slide is provided which is both lockable and tamperproof.

3,587,914
SELF SEALING UNITS FOR FUEL CELLS
Geoffrey Charles Jennings, Brewood, and Ronald Leslie Grosvenor, Codsall, England, assignors to Marston Excelsior Limited, Wolverhampton, England
Filed May 24, 1968, Ser. No. 731,825
Claims priority, application Great Britain, May 26, 1967, 24662/67
Int. Cl. B65d *25/14*
U.S. Cl. 220—63 **4 Claims**



A vehicle comprises a fuel cell defined by vehicle frame structure members, at least some of the inner surfaces of the cell having self-sealing units bonded thereto.

3,587,915
BOTTLE CARRIER OF PLASTICS MATERIAL
Reiner Theobald, Frankfurt am Main, Germany, and Stephane Luc-Belmont, Neuilly sur Seine, France, assignors to Vereingte Deutsche Metallwerke AG, Frankfurt, Germany and Compagnie de Saint Gobain, Neuilly Sur Seine, France, fractional part interest to each
Filed Sept. 30, 1968, Ser. No. 763,768
Claims priority, application Germany, Oct. 4, 1967, P 15 86 815.2
Int. Cl. B65d *75/00*
U.S. Cl. 220—102 **1 Claim**



A structure which is W-shaped in cross section comprises longitudinal walls that define open-topped, longitudinal troughs for receiving bottles, which walls are formed with apertures having edges for holding such bottles in position in

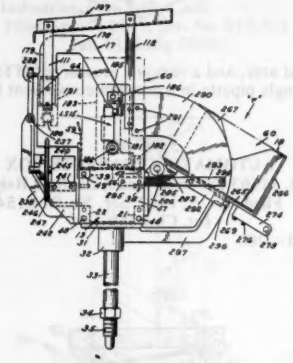
said troughs. Stiffening members extend across and connect the end edges of said walls at both ends of said structure adjacent the top of the walls.

3,587,916

AUTOMATIC CONTAINER LOADER APPARATUS

Robert C. Kellogg, Wixom, and Philip C. Martin, Walled Lake, Mich., assignors to Ex-Cell-O Corporation, Detroit, Mich.

Filed Apr. 10, 1969, Ser. No. 815,045
Int. Cl. G07f *11/12*
U.S. Cl. 221—11 **24 Claims**



An automatic container loading apparatus for continuously feeding containers to a feeder means on a container forming and filling machine. The loader apparatus comprises a container conveyor means incorporating a magazine feed section for operatively supporting a first stack of containers for feeding the containers to said feeder means, and a container reserve section for operatively supporting a reserve second stack of containers for automatic transfer to said magazine feed section when the first stack is reduced to a predetermined number of containers, pusher means operatively mounted on said conveyor means for maintaining a decreasing pressure on said first stack of containers in said magazine feed section for continuously feeding the containers in said first stack of containers to said feeder means, and transfer means operatively engageable with said second stack of containers in said reserve section for transferring said second stack of containers from said reserve section to said magazine feed section for replenishing said first stack of containers.

ERRATUM

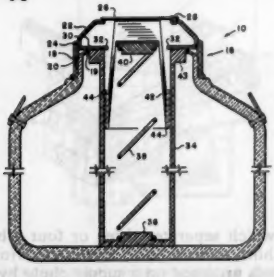
For Class 221—093 see:
Patent No. 3,587,909

3,587,917

CUP DISPENSING LIQUID CONTAINER

Benito Triglia, 53 Old Albany Post Road, Ossining, N.Y.

Filed May 6, 1970, Ser. No. 35,157
Int. Cl. A47f *1/00*
U.S. Cl. 221—96 **7 Claims**



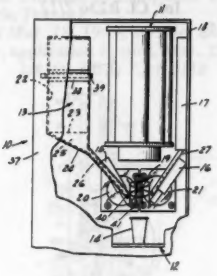
A liquid container for dispensing cups is provided with a central insertable tube spring loaded for disposing cups upwardly. In an embodiment, protrusions in a swivel top cap permit one at a time dispensing of cups, and in a further embodiment, protrusions in the insertable tube permit one at a time dispensing.

3,587,918

COMESTIBLE DISPENSING MACHINE

Richard T. Cornelius, Minneapolis, Minn., assignor to The Cornelius Company, Anoka, Minn.

Filed Feb. 19, 1969, Ser. No. 800,421
Int. Cl. A47f *1/00*; A07f *11/00*
U.S. Cl. 221—96 **13 Claims**



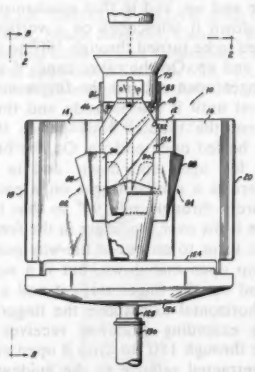
A dispensing machine for comestibles such as beverages includes a cup vender, a vender for a utensil such as a straw, a plurality of dispensing valves for comestibles such as beverages, and a corresponding plurality of selector switches, all of which is under the control of a coin-actuated timer.

3,587,919

CUP-POSITIONING ASSEMBLY

Bruce B. Landis, Long Valley, N.J., assignor to Rowe International, Inc., Whippany, N.J.

Filed Jan. 16, 1969, Ser. No. 791,570
Int. Cl. B65h *3/00*
U.S. Cl. 221—194 **23 Claims**



An assembly for guiding a cup from a magazine to a location behind a beverage machine cabinet access opening and for positioning the cup upright adjacent the machine beverage dispenser, in which a funnellike guide which receives a cup from the magazine adjacent the back of the assembly delivers the cup to a downwardly and forwardly inclined chute along which the cup slides toward a tray behind the access opening. Respective guide flaps are supported loosely for pivotal movement adjacent the bottom of the chute for movement around generally vertical axes at positions at which they engage the cup lip as it comes to rest on the tray. Resilient means lightly biases the flaps to neutral positions from which they may be moved in either direction

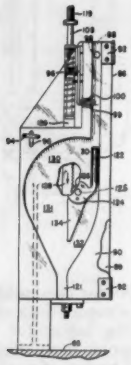
around their axes of movement. All of the elements of the assembly are connected by readily manually releasable means and the assembly itself is readily releasably mounted in the machine cabinet.

3,587,920

MECHANISMS FOR FEEDING AND DROPPING ELONGATED TUBULAR BODIES AND CAPS

Carl F. Avery, Jr.; Ernest A. Pearson, and Lloyd V. Winters, Rockford, Ill., assignors to Medical Supply Company, Rockford, Ill.

Division of Ser. No. 599,841, Dec. 7, 1966, Pat. No. 3,461,535.
Filed Mar. 19, 1969, Ser. No. 808,540
Int. Cl. B23q 7/12
U.S. Cl. 221—171 **8 Claims**



The mechanisms herein shown for feeding and dropping elongated tubular bodies and caps are incorporated in a rotary machine, the round table of which is indexed from station to station, receiving at one station a tubular body or holder, at another station an ampul, at a third a cylindrical swab, and finally a tubular cap or cover is applied at a subsequent station, after which the completed article is discharged at the last station. One mechanism feeds the tubular bodies open end up, and in that mechanism if a body is fed open end down it telescopes on a vertical finger of a member adapted to be turned through 180° to drop the tubular body open end up. On the other hand, if a tubular body reaches the finger open end up the finger merely stops its downward travel until it moves aside and through 180° in which movement the tubular body passes the finger and drops so as to be fed open end up. On the other hand, the caps must be fed open end down, and in the cap feed mechanism there is a similar finger on a part arranged to swing downwardly through only 90° so that if a cap is fed open end down it fits over the finger in the feed channel and the finger then turns to an out-of-the-way position allowing the cap to drop open end down, but if a cap reaches the finger open end up, the finger stops it and a rotary device turning on a horizontal axis above the finger and having a diammetrically extending guideway receives the cap and turns the same through 180° to drop it open end down while the figure is retracted relative to the guideway, the rotary device being turned in timed relation to the 90° swinging of the finger.

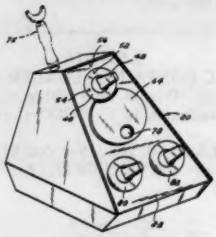
3,587,921

MICROPIPETTE DISPENSER

Anthony Giangarra, Hasbrouck Heights, and Kenneth J. Cybulsky, East Paterson, N.J., assignors to Becton, Dickinson and Company, East Rutherford, N.J.

Filed Apr. 8, 1968, Ser. No. 719,532
Int. Cl. B23q 7/00
U.S. Cl. 221—174 **1 Claim**

A dispenser for micropipettes and the like including a storage area for containing a plurality of pipettes, means for transporting the pipettes one at a time from said storage area



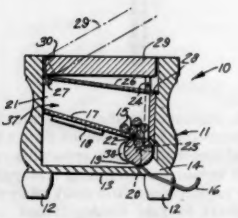
to a removal area, and a removal area adapted to receive and contain a single pipette in a position convenient for removal.

3,587,922

AUTOMATIC CIGARETTE BOX

Biagio Oriti, 11603 Fordham Road, Garfield Heights, Ohio

Filed Nov. 5, 1969, Ser. No. 874,154
Int. Cl. B65h 3/60
U.S. Cl. 221—203 **5 Claims**



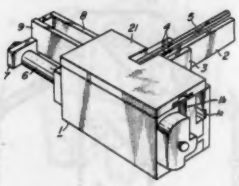
A container for dispensing cigarettes and cigars or the like. This device includes a pivotable cover which when pressed downwards will rotate a recessed roller which will carry a single cigarette into a passageway of the container whereupon by gravity the cigarette will roll down into a tray. The roller of the device is attached to a spring which will return the roller to its normal cigarette pickup position simultaneously with the cover that was depressed to dispense one cigarette.

3,587,923

DEVICE FOR SIMULTANEOUSLY SEPARATING AND FEEDING THREE OR FOUR GIB-HEADED RODS

Tamotsu Tanaka, Hirakata-shi, and Syozi Hara, Kadoma-shi, Japan, assignors to Matsushita Electrical Co., Ltd., Osaka, Japan

Filed May 27, 1969, Ser. No. 828,239
Claims priority, application Japan, May 31, 1968, May 31, 1968, May 31, 1968, July 15, 1968, 43/37394; 43/37395; 43/37396; 43/60832
Int. Cl. B65h 5/00; G07f 11/16
U.S. Cl. 221—224 **10 Claims**



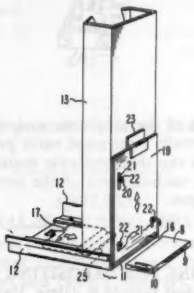
A device which separates three or four gib-headed rods such as machine screws, bolts, rivets, etc. from a series of gib-headed rods arranged on a supply chute by a reciprocating guide plate having oblique guide grooves, distributes

them individually to respective fall openings by a reciprocating distributing means having notched and shouldered portions for receiving them, and simultaneously discharges them from the fall openings to respective transfer pipes via a shutter plate, wherein the guide plate, distributing means and shutter plate are simultaneously reciprocated by a common power piston means so as to simultaneously feed three or four gib-headed rods to, for example, the head of a multiscrew driver in each reciprocating cycle of operation.

3,587,924
ARTICLE DISPENSER

Anthony N. DiOrio, Santa Clara, Calif., assignor to Micro Magnetic Industries, Palo Alto, Calif.

Filed Apr. 7, 1969, Ser. No. 813,921
Int. Cl. B65g *59/06*
U.S. Cl. 221—251 **4 Claims**

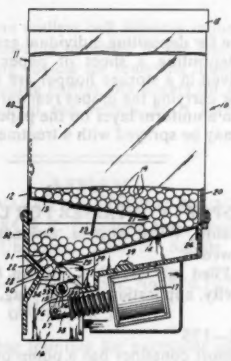


An article dispenser which will handle articles of uneven or nonuniform size and/or rough assembly is disclosed. A plate is mounted on the dispenser over the egress opening, the plate having a beveled edge which is engaged by the article as it is being dispensed. The article acts against the plate edge to raise the plate from the opening to allow the article free egress, the plate blocking any other articles. The ejector slide simultaneously lifts the stack of articles off of the one being ejected.

3,587,925
ARTICLE-VENDING MECHANISM

Paul Keller, Coon Rapids, Minn., assignor to The Cornelius Company, Anoka, Minn.

Filed Feb. 19, 1969, Ser. No. 800,420
Int. Cl. G07f *9/00*
U.S. Cl. 221—266 **23 Claims**

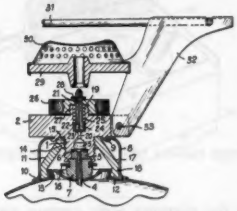


An article-vending mechanism includes a storage compartment that discharges by gravity through a trickle apparatus, thence across a storage ramp in association with means for controlling the height of goods thereon, and then to a movable discharge member which is movable between two positions. In its first position, the movable discharge member provides a sanitary closure and in its second position vends one article to a discharge chute. An actuator drives the movable discharge member which has an abutment for impacting the storage ramp.

3,587,926
CARTRIDGE-PUNCTURING AND DISPENSING APPARATUS

Jean Andre Lherault, Paris, France, assignor to Societe Industrielle Pour La Diffusion D'Equipment Et De Material "-Sidemat", Paris, France

Filed Mar. 18, 1969, Ser. No. 808,258
Claims priority, application France, Mar. 29, 1968, 146440
Int. Cl. B67b *7/24, 5/58*
U.S. Cl. 222—5 **5 Claims**

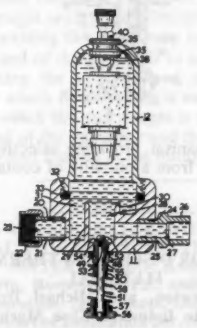


A cartridge-puncturing and dispensing apparatus for connection to a cartridge provided with a projecting circular head having reentrant flanks, said apparatus comprising a valve body having a bottom portion incorporating a perforating nozzle and a seal, said bottom portion being engaged by threads with a crown of claws having internal teeth adapted to be engaged around the head of the cartridge with a skirt of suitable diameter depending from the valve head to surround slidingly the claws of the crown and to lock the latter.

3,587,927
AUTOMATIC SHUTOFF VALVE AND GAS TRAP

Reginald W. Stott, South Burnaby, Canada, assignor to Beermaster Industries Ltd., British Columbia, Canada

Continuation of application Ser. No. 658,745, Aug. 7, 1967, now abandoned. This application July 30, 1969, Ser. No. 848,407
Int. Cl. B67d *5/32*
U.S. Cl. 222—66 **8 Claims**



This invention provides an automatic shutoff valve and gas trap. A main body portion is provided with an inlet passage (preferably radial) and a valved outlet passage (preferably radial) which two passages are preferably interconnected by an axial passage. An annular valve seat is provided for the

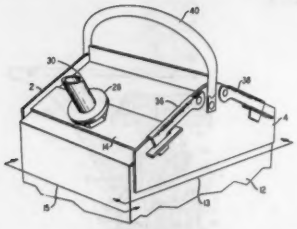
axial passage. Attached to the main body portion is a float bowl containing a float valve. The float valve is untethered and is operatively connected to the valved outlet passage. The valve is guided to oscillate vertically between two positions. The first position is a liquid-dispensing position when the valve on the valved outlet passage is open. The second position is a liquid-shutoff position when the valve is closed. In the liquid-dispensing position, the inlet and outlet passages, as well as the bowl, are filled with liquid, while in the liquid-shutoff position, the inlet passage and the bowl are emptied of liquid and the outlet passage is filled with liquid.

3,587,928

HANDLE AND POURING SPIGOT FOR CONTAINERS

Patrick D. Charmel, 81 George St., Carteret, N.J. 07088

Filed Nov. 12, 1969, Ser. No. 875,786
Int. Cl. B67b *7/26*
U.S. Cl. 222—91 **5 Claims**



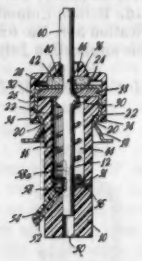
A device for carrying milk cartons and the like includes two end plates, each of which in turn, include a wedge-shaped member for inserting into the folds of the milk carton. Two support braces releasably join the end plates to secure the device on the carton. One of the support braces includes a tapped hole into which a pouring spigot may be screwed.

3,587,929

MULTIPLE ELEMENT AEROSOL DISPENSER

Norman Usen, West Haverstraw, and Charles Edward Krachy, Buchanan, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Feb. 14, 1969, Ser. No. 799,402
Int. Cl. B65d *83/06*
U.S. Cl. 222—129 **19 Claims**



An aerosol mechanism providing selective dispensing of aerosol formulation from a plurality of container interior locations.

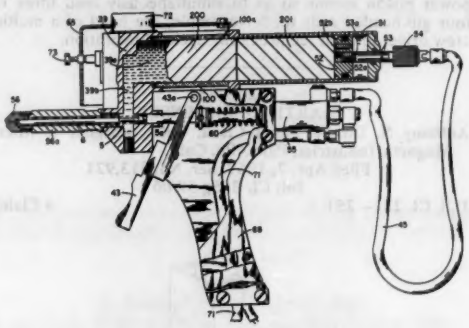
3,587,930

APPARATUS FOR DISPENSING THERMOPLASTIC MATERIAL

George Schultz, Newton, and Michael Dziki, Dorchester, Mass., assignors to Industrial Shoe Machinery, Roxbury, Mass.

Continuation-in-part of application Ser. No. 712,224, Mar. 11, 1965, now abandoned. This application July 29, 1969, Ser. No. 847,817
Int. Cl. B67d *5/62*
U.S. Cl. 222—146HE **11 Claims**

Thermoplastic resins are fed to a desired location by an apparatus having a well with a heated inner section, provided with a discharge orifice, and an unheated outer section. A fitted, normally solid member of thermoplastic material is placed in the well whereupon only its bottom portion becomes molten. Continuous fluid pressure is applied on the



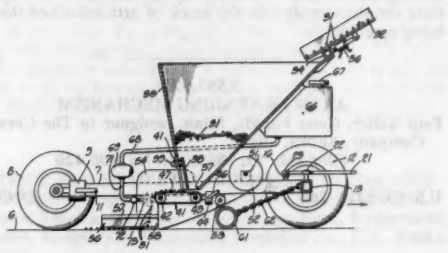
exposed solid end of thermoplastic material and in conjunction with an externally controlled valve provides controllable feed, yet protects the thermoplastic material from oxidative degradation. One embodiment of the invention comprises a portable cement gun.

3,587,931

MACHINE FOR DEPOSITING GRAPES

Henry E. Studer, and Harold P. Olmo, Davis, Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed July 17, 1969, Ser. No. 842,474
Int. Cl. A01c *15/00*
U.S. Cl. 222—176 **8 Claims**



A machine for depositing individual grapes has an advancing frame depositing a sheet of paper onto the ground. Grapes received in a storage hopper are metered out onto a belt conveyor carrying the grapes rearwardly and discharging them to lie in a uniform layer on the paper. The grapes being discharged may be sprayed with a treatment liquid.

3,587,932

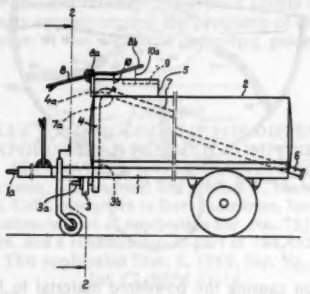
TRANSPORT CONTAINER FOR LIQUID DUNG

Engelbert Baum, Wien, Austria, assignor to Alfa-Laval AB, Tumba, Sweden

Filed July 25, 1969, Ser. No. 844,912
Claims priority, application Austria, Aug. 5, 1968, A7609/68
Int. Cl. A01c *15/00*
U.S. Cl. 222—178 **6 Claims**

The transport container has a pump by which liquid dung in the container is forced through a rising pressure pipe terminating in the upper part of the container adjacent the inlet end of a feed pipe, the latter extending to a pressure outlet for spreading the liquid dung on a field. The inlet end of the

feed pipe is adjustable relative to the adjacent end of the rising pressure pipe, whereby the liquid dung can be selectively



spread through the pressure outlet or circulated within the container.

3,587,933

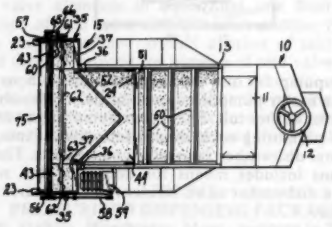
MATERIAL-SPREADING APPARATUS

Clarence H. Regnier; Edward J. Stewart, and Peter E. Stewart, West Saint Paul, Minn., said Regnier assignor to Edward J. Stewart and Peter E. Stewart, St. Paul, Minn.

Filed May 5, 1969, Ser. No. 821,631

Int. Cl. A01c *15/00*

U.S. Cl. 222—178 **10 Claims**



A frame having an endless belt drivably mounted thereon, adapted to be removably mounted in the bed or box of a material-transporting vehicle for removing material from the truck bed and including baffles and augers for spreading the material evenly behind the vehicle as it travels over the ground.

3,587,934

THERMOWATER DISPENSING FOUNTAIN

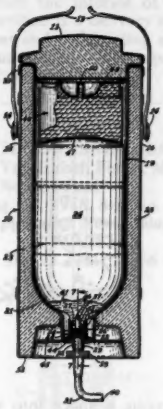
Austin E. Elmore, 8519 E. Pasadena Ave., Scottsdale, Ariz., and Ernest A. Uhlmann, 5202 N. Saddle Rock Road, Phoenix, Ariz.

Filed Nov. 5, 1969, Ser. No. 874,127

Int. Cl. B67d *5/06*

U.S. Cl. 222—181 **5 Claims**

A water dispensing fountain for particular use of bed patients in a hospital and the like comprising an insulative canister containing a collapsible plastic bag containing the liquid to be dispensed, a perforating device at the bottom of the bag connected to a dispensing hose and discharge mouthpiece, a frozen gel cooling medium on top of the plastic bag to cool and force fluid from the bag, and a closure



cover and hanging bail to position the unit in operative position.

3,587,935

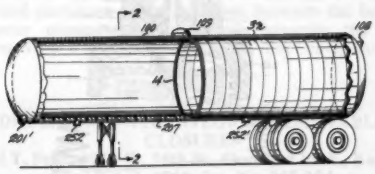
MATERIAL CONTAINER WITH END DISCHARGE PORT

Hamilton Neil King Paton, Bellevue, Wash., assignor to Dynabulk Corporation, Bellevue, Wash.

Filed Jan. 8, 1969, Ser. No. 789,704

Int. Cl. B65g *3/12*

U.S. Cl. 222—195 **2 Claims**



In a horizontally elongated container a cup-shaped membrane has its margin secured in the central upright plane of the container enabling the membrane to move from a position lining one end of the container to an inside out position substantially lining the opposite end of the container. A porous floor to which fluidizing air is supplied extends from the location at which the cup margin is attached to the container to one end of the container and that container end has in it a discharge port located at the bottom of the container.

3,587,936

MOVABLE WALL SEPARATORS FOR PARTICULATE MATERIAL STORAGE TO PREVENT BRIDGED MATERIAL BLOCKAGES

Dominic J. Riotto, Barnesville, Pa., assignor to Commercial Solvents Corporation, Terre Haute, Ind.

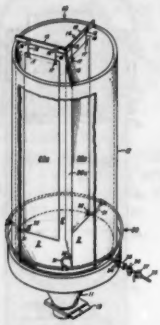
Continuation-in-part of application Ser. No. 604,888, Dec. 27, 1966, now abandoned. This application Jan. 21, 1969, Ser. No. 814,215

Int. Cl. B65g *3/12*

U.S. Cl. 222—196 **13 Claims**

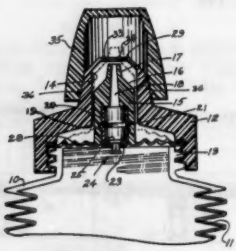
Movable separators are vertically suspended within a particulate material container to form a plurality of vertical zones or compartments, each compartment having at least

one movable wall in common with an adjacent compartment. If, upon removal of the particulate material from the container, the material in one or more compartments has become tightly packed, the flow of material from an adjacent



compartment will create a space into which the separator dividing the two compartments will move. This effectively collapses any bridge by dislocating one of its anchor points, and thereby facilitates free flow from the container.

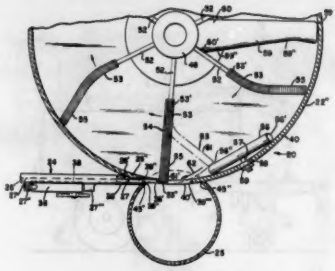
3,587,937
COMBINED CONTAINER AND DISPENSING CAP
Robert L. Childs, 2829 N. Point Road, Baltimore, Md.
Filed July 18, 1969, Ser. No. 843,027
Int. Cl. B65d *3/100*
U.S. Cl. 222—213 **6 Claims**



A combined container and dispensing cap therefor in which the container is compressible and the cap is provided with a projectable and retractable spout, the latter being projected outwardly of the cap by pressure being applied to the container to dispense the contents thereof and retracted within the cap upon release of such pressure and a valve means in the spout opening upon application of pressure to the container and closing upon release of said pressure.

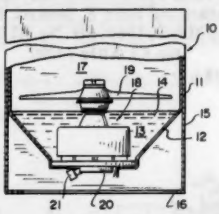
3,587,938
METERING DEVICE
Lawrence Russell Brown, Grand Forks, N. Dak., assignor to AGSCO Chemicals Inc., Grand Forks, N. Dak.
Filed Apr. 14, 1969, Ser. No. 815,546
Int. Cl. G01f *11/00*
U.S. Cl. 222—228 **4 Claims**

The invention comprises a metering device having a cylindrical container adapted to receive powdered material, an adaptable sliding valve on the container to open and close an opening in the container, a rotary spoke mechanism at the bottom of the container having a plurality of radially extending spokes with coil springs mounted to the outer ends of the spokes, the coil springs acting to sweep the powdered material toward the opening, a retard and release rod in the container retarding and releasing each coil spring as it reaches the opening with the release of the coil springs creating a



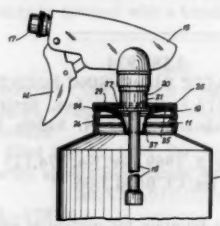
whip reaction causing the powdered material to be thrown through the opening.

3,587,939
MOTOR-PUMP
Arne M. Nystuen, Stevensville, and Gerhard W. Neumann, St. Joseph, Mich., assignors to Whirlpool Corporation
Filed Nov. 7, 1968, Ser. No. 774,049
Int. Cl. G01f *11/06, 11/30*
U.S. Cl. 222—333 **8 Claims**



A motor-pump for use in an apparatus such as a dishwasher. The motor-pump is adapted to be submersible in the sump of a dishwasher tub. The motor-pump has an extremely low profile permitting such installation without interference to the normal dishwasher apparatus components. The motor-pump means includes means for delivering the water for draining the dishwasher as an incident of the reverse rotation of the motor.

3,587,940
CONVERSION KIT ADAPTER FOR DISPENSERS
Roy T. Ellis, Dayton, Ohio, assignor to Rubber-Seal Products Company, Inc., Dayton, Ohio
Filed June 4, 1969, Ser. No. 830,400
Int. Cl. B65d *47/34*
U.S. Cl. 222—383 **6 Claims**



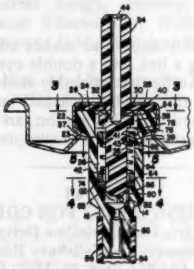
A conversion kit for converting liquid ejector pumps to fit onto containers of different sizes. The pump has a dip tube

surrounded at its upper end by a collar that has a laterally projecting flange at its lower end. The variant-sized container cap has a hole passing over the flange so it can surround the tubular collar. A resilient split washer having a central opening large enough to pass around the collar but not over the flange holds the cap above the flange. Below the flange there is another resilient retainer ring pressed snugly into the cap, and sealingly engages around the periphery of the lower face of the flange. It has a conical depending guide for the dip tube.

3,587,941
VALUE WITH MOLDED LIP FOR DISPENSING VAPOROUS AND PRODUCT COMPONENTS SEPARATELY AND SEQUENTIALLY

Samuel Prussin, Los Angeles, and Jimmie L. Mason, Hacienda Heights, Calif., assignors to Dart Industries, Inc.

Continuation-in-part of application Ser. No. 751,900, Aug. 12, 1968, and a continuation-in-part of 784,452, Dec. 17, 1968. This application Mar. 5, 1969, Ser. No. 804,526
Int. Cl. B65d *83/14*
U.S. Cl. 222—402.17 **2 Claims**

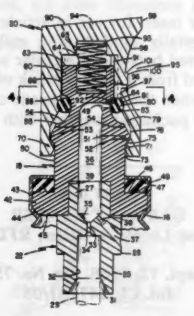


A sequential valve having a housing and a corrosion-resistant valve means reciprocally mounted therein, said valve means being cooperable with three spaced-apart valve elements in said housing, such that said valve means may be forced into open position sequentially with respect to said spaced valve elements in order that one fluid may flow around one of said valve elements after another fluid is shut off with respect to flow around another of said valve elements to thereby provide for purging of said valve at the end of each operating cycle thereof, and wherein one of said valve elements is operable to prevent the purging fluid from passing through the valve during a time when products such as paint, or the like, are being dispensed through the valve.

3,587,942
PRESSURIZED DISPENSING PACKAGE

Adolph R. Gailitis, Winchester, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Apr. 28, 1969, Ser. No. 819,628
Int. Cl. B65d *83/14*
U.S. Cl. 222—402.24 **20 Claims**

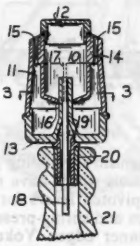


A pressurized dispensing package including a stem having an interior mixing chamber and a discharge orifice, a sealing member closing this orifice, an actuator button, including an exit aperture open to atmosphere, secured to the stem and relatively moveable therewith to open the discharge orifice to atmosphere through the exit aperture, and biasing means disposed between the button and stem externally of the flow path of material from the interior of the package to atmosphere. Also described is a delivery system having an annular sealing member and cooperating actuating and sealing grooves on the actuator and stem respectively for opening and closing the discharge orifice.

3,587,943
BOTTLE OR LIKE POURERS

Leonardus Marinus Van Hulsel, Flat 1, Maple Flats, Worksop Road, Masterton, New Zealand

Filed Aug. 26, 1968, Ser. No. 755,216
Claims priority, application New Zealand, Sept. 6, 1967, 149,987
Int. Cl. G01f *11/26*
U.S. Cl. 222—455 **5 Claims**

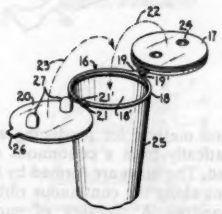


A measuring pourer for a bottle or the like comprising a generally cylindrical body having a lower portion adapted for fitting into or onto an open end of the bottle or the like, an inner compartment provided in and concentrically arranged with the said body, tubes extending from inside the inner compartment and through the lower portion of the body for extending into the bottle, two pourer openings located diametrically opposite one another at the upper end of the body and partitions extending down between the body and the inner compartment to equally separate the pourer openings from a lower open end of the inner compartment.

3,587,944
DISPENSERS WITH INTEGRAL REMOVABLE CLOSURES

Harold T. Pehr, 3920 W. 96th St., Overland Park,, Kans.

Filed Oct. 7, 1968, Ser. No. 765,384
Int. Cl. B67d *3/00*
U.S. Cl. 222—480 **4 Claims**



A dispensing apparatus having a plurality of integrally connected parts for use with dispensing containers wherein the dispensing apparatus has a portion framing a central aperture therethrough, a first closure portion movable to close the aperture and having at least one material-dispensing passageway extending therethrough, and a second closure portion having a passageway closing structure with the second closure portion being movable relative to the first closure portion to close the passageway. Cooperating surfaces or portions of the framing portion and the first closure por-

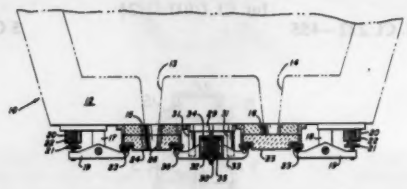
tion being engageable to maintain the first closure portion in position closing said central aperture. The second closure has a gripping portion for facilitating the movement of second closure relative to the first closure portion for opening said material-dispensing passageway.

3,587,945

SUPPORTING MECHANISM FOR MULTIPLE CLOSURES ON BOTTOM-DISPENSING VESSELS

Joseph H. Lanatti, Penn Township, Westmoreland County, and James T. Shapland, Wilkins Township, Allegheny County, Pa., assignors to United States Steel Corporation

Filed Jan. 16, 1969, Ser. No. 791,717
Int. Cl. B67d *3/00*
U.S. Cl. 222—481 **3 Claims**



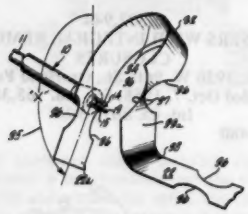
A supporting mechanism for sliding gate closures used on bottom-dispensing vessels which have more than one outlet. Mechanism includes pivoted levers for supporting the outer edges of a pair of gates and spring-pressed yokes for supporting the confronting inner edges. Yokes are more compact than levers for supporting inner edges.

3,587,946

METHOD AND MACHINE FOR THE MANUFACTURE OF POM-POM BOWS

Ferdinand Christensen, 13207 Loumont Ave., Whittier, Calif.

Continuation-in-part of application Ser. No. 770,237, Oct. 24, 1968. This application Feb. 26, 1970, Ser. No. 14,294
Int. Cl. A41h *43/00*
U.S. Cl. 223—46 **24 Claims**



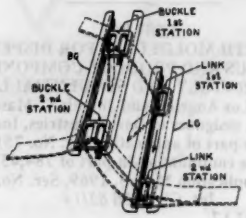
An apparatus and method for producing attractive pom-pom bows automatically from a continuous strip of ribbon material is disclosed. The bows are formed by feeding successive ribbon portions along the continuous ribbon length to a ribbon-holding mandrel. A plurality of successive tufted loops are formed disposed radially about the mandrel. In the formation of each loop the ribbon is twisted 180° on its longitudinal axis proximate to each point of attachment of the ribbon to the mandrel. In order to accomplish the twisting, the ribbon is provided with reduced width areas. The reduced width areas enhance the twistability of the ribbon and enable proper placement of the loops without hand manipulation. In the disclosed embodiment the twisting of the ribbon and the placement of the successive loops is accomplished by rotary indexing of the mandrel relative to the ribbon-feeding mechanism as the ribbon is fed to the mandrel.

3,587,947

APPARATUS FOR MAKING A BUCKLE AND STRAP ASSEMBLY

Charles Block, North Bellmore, and Leon J. Mintz, Syosset, N.Y., assignors to Undergarment Assemblies, Inc., Copiague, N.Y.

Filed Sept. 24, 1969, Ser. No. 860,777
Int. Cl. A41h *43/00, 37/08*
U.S. Cl. 223—49 **7 Claims**



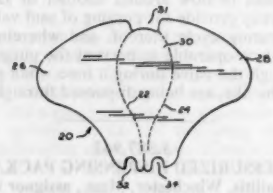
Automatic assembly apparatus makes adjustable strap assemblies comprising a link and a double eyelet buckle at two assembly stations. At the first assembly station, the adjustable section is threaded through the link and buckle, cut off and tipped. At the second assembly station, an anchor section is applied and the adjustable section is completed.

3,587,948

PACKAGING INSERT FOR COLLARS

Myron S. Strasser, Jr., 16 Sky Hollow Drive, Menands, N.Y., and Samuel A. Strasser, 124 Salisbury Road, Delmar, N.Y.

Division of Ser. No. 694,454, Dec. 29, 1967, Pat. No. 3,448,901. This application Aug. 12, 1968, Ser. No. 810,396
Int. Cl. D06c *15/00*
U.S. Cl. 223—84 **1 Claim**



A garment collar insert for use in article packaging that is configured substantially to that of a collar thereby to be received and retained between the collar and garment front. The insert is formed from a unitary blank of material which is sufficiently rigid when folded to prevent collar deformation when the article is packaged together with other similar articles.

3,587,949

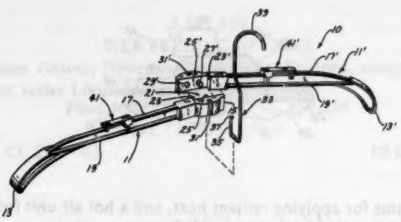
GARMENT HANGER

Louis S. Reller, and Lucille S. Reller, RFD 03, Washington, Iowa

Filed Sept. 12, 1968, Ser. No. 759,383
Int. Cl. A47j *51/08*
U.S. Cl. 223—93 **3 Claims**

A garment hanger comprising identical first and second hanger portions which are detachably secured together at their inner ends to form the hanger. The inner ends of the hanger portions are provided with mating connection means

and are also maintained together by a hook means having its lower end embracing the same. The hanger portions are each



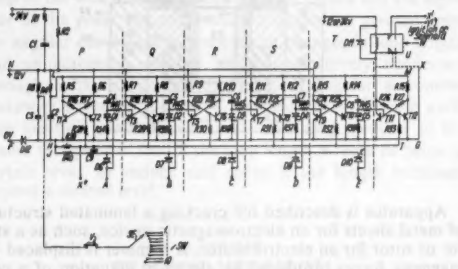
provided with a resilient garment clip means which is integrally formed with the hanger portion.

3,587,950

CONTROL DEVICE RESPONSIVE TO A SEQUENTIAL CODE

Richard Woolliscroft Haigh, Shelsley, Beauchamp, and Frederick Vincent Commander, Wollaston, Stourbridge, England, assignors to U.M. Electrical Distributors Limited, Kent, England

Filed Mar. 21, 1969, Ser. No. 809,290
Int. Cl. H01h *47/00*
U.S. Cl. 317—134 **13 Claims**



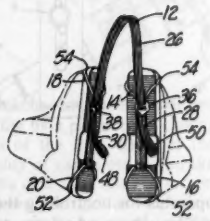
A control device comprises five gate circuits connected in cascade. The gate circuits are brought into a conducting phase and a nonconducting phase sequentially by sequentially applied external pulses, each gate circuit being brought into the conducting phase by one of the external pulses only if the preceding gate circuit is in the conducting phase. The preceding gate circuit substantially goes into this nonconducting phase. The electrical apparatus is actuated only if the gate circuits are brought into and out of said conducting phase in a predetermined sequence.

3,587,951

BOOT SLING

Michael R. Derouin, c/o Elite Mountain Products Box 672, Aspen, Colo.

Filed Feb. 11, 1969, Ser. No. 798,352
Int. Cl. B65d *63/00*
U.S. Cl. 224—5 **6 Claims**



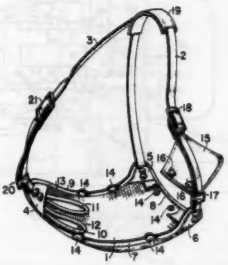
A sling for boots including a flexible strap with a pair of spaced-apart loops attached to the strap at each end thereof. The loops of each pair are positionable about the toe and heel of a boot. A frictional snubbing link is provided to permit adjustment of the spacing between the loops of each pair for their positioning about the boot and for releasably securing the loops in snug engagement with the boot.

3,587,952

BABY CARRIER

Takeo Higuchi, 83-8, Aoyanagi, I keda-cho, Ibi-gun, Gifu-ken, Japan

Filed Aug. 12, 1969, Ser. No. 849,379
Claims priority, application Japan, Aug. 13, 1968, 43-69722
Int. Cl. A47d *13/02*
U.S. Cl. 224—6 **4 Claims**



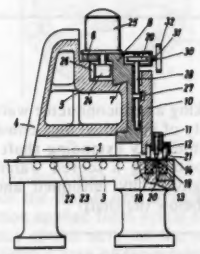
This invention relates to a baby carrier for safely holding and carrying a baby, comprising a soft main carrier to serve as a seat or bedding for a baby, a supporter removably fastened and extended from a number of edges of the main carrier, and shoulder strings to retain the said main carrier at the neighborhood of the breast of a nurse, the said main carrier having two openings at the near of its one end for inserting both legs of a baby in order to rest a baby on its back or in a position comfortable for settling its body in the body of a nurse.

3,587,953

METHOD AND APPARATUS FOR SEVERING OF METAL BAND OR METAL PLATE

Max Stehle, Mannheim, and Egon Kirchner, Mannheim-Feudenheim, Germany, assignors to Brown, Boveri & Cie Aktiengesellschaft, Mannheim-Kafertal, Germany

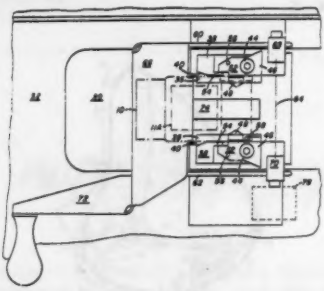
Filed Aug. 26, 1968, Ser. No. 791,822
Claims priority, application Germany, Aug. 24, 1967, 1,627,152/6
Int. Cl. B26f *3/00*
U.S. Cl. 225—2 **10 Claims**



Method of severing metal sheet such as bands and plates into strips includes feeding the sheet in a given direction, passing a chip-removing tool transversely to the feed direction over the sheet at a rigidly supported location thereof so as to form a groove in the sheet having a depth

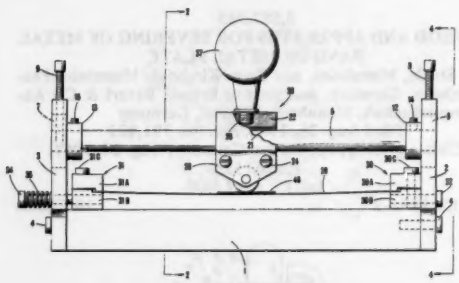
equal to at least half the thickness of the sheet, and oscillating the sheet portions on both sides of the groove relative to one another so that the remainder of the thickness of the sheet is broken through along the groove; and device for carrying out the foregoing method.

3,587,954
CARTRIDGE OPENER
Harold C. Pierce, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Feb. 26, 1969, Ser. No. 802,511
Int. Cl. B26f 3/00
U.S. Cl. 225—93 **7 Claims**



A photographic film cartridge opener and waste ejector incorporating an elongated cartridge moving lever and handle to reduce the operating force required.

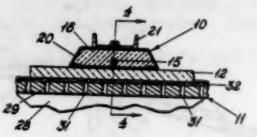
3,587,955
DICE BREAKER
Aime Albert Gehri, Beverly, Mass. (168-188 Albion St., Wakefield, Mass. 01880)
Division of Ser. No. 696,433, Jan. 8, 1968. This application July 22, 1969, Ser. No. 860,456
Int. Cl. B26f 3/00
U.S. Cl. 225—103 **8 Claims**



A means for breaking a semiconductor wafer that has been scored into a plurality of individual dice consisting of a roller mounted on a longitudinally extending shaft adapted to roll over a sandwich containing a scored wafer and a flexible band of metal longitudinally tensioned and positioned in alignment with and below the shaft.

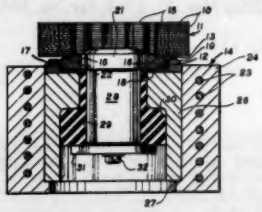
3,587,956
APPARATUS FOR CUTTING GLASS PLATES
Waldemar W. Oelke, Rossford, Ohio, assignor to Libbey-Owens-ford Company, Toledo, Ohio
Filed May 2, 1969, Ser. No. 821,405
Int. Cl. H05b 3/06; B26f 3/12
U.S. Cl. 225—93.5 **9 Claims**

A method and apparatus for cutting glass plates by applying heat along the desired line of cut from a source which is spaced from the surface of the plate. Resistance-type heating



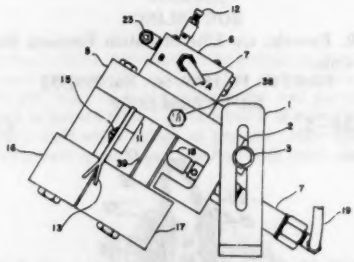
apparatus for applying radiant heat, and a hot air unit for applying convected heat are provided.

3,587,957
APPARATUS FOR CRACKING LAMINATED STRUCTURES
Paul Wildi, San Diego, Calif., assignor to Gulf Energy & Environmental Systems, Inc., San Diego, Calif.
Filed Feb. 3, 1969, Ser. No. 795,983
Int. Cl. B26f 3/04
U.S. Cl. 225—104 **10 Claims**



Apparatus is described for cracking a laminated structure of metal sheets for an electromagnetic device, such as a stator or rotor for an electric motor. A hammer is displaced by magnetic forces, produced by electrical actuation of a coil assembly, to engage the laminated structure and impart sufficient strain thereto as to effect the desired cracking.

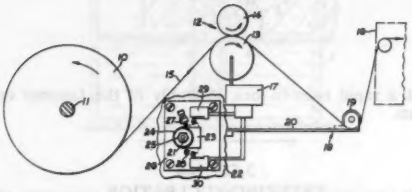
3,587,958
APPARATUS FOR CONTROLLING THE TRACKING OF CONTINUOUS SHEETS OF FILM
Monroe F. Taylor, Greenville, S.C., assignor to W. R. Grace & Co., Duncan, S.C.
Filed Apr. 8, 1969, Ser. No. 814,307
Int. Cl. B65h 23/02
U.S. Cl. 226—17 **2 Claims**



A method and apparatus for controlling the tracking of a continuous sheet of film whose edges are taut comprising monitoring the position of the film edges and passing the film edges between pairs of opposed rollers set at a predetermined angle so that when a roller pair is closed in response to

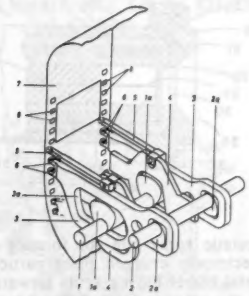
the edge monitoring the film moves in the direction of the closed roller pair.

3,587,959
WEB FEEDING DEVICES
William Glover, Newcastle-Upon-Tyne, England, assignor to Formaster Limited, Peterborough, England
Filed June 2, 1969, Ser. No. 829,235
Int. Cl. B65h 25/04
U.S. Cl. 226—43 10 Claims



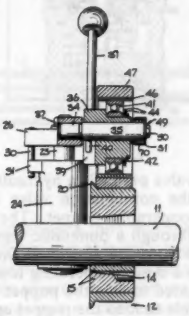
Web-feeding device, particularly for a rotogravure-printing press has means for feeding web whose speed of operation is regulated by the position of a control roller around which a loop of the web passes between the feed means and the input side of the press, the roller being mounted on pivoted arms for angular movement in response to changes in loop length and an actuating member being nonpositively connected through a friction pad to the arms for angular movement therewith between fixed stops. Microswitches adjacent each stop position are actuated by the actuating member to increase the speed of feed if the loop length is reduced below a certain level, or reduce said speed if the length increases beyond a second level.

3,587,960
FILM FEED MECHANISM
Joachim Gerb, Munich, Germany, assignor to Arnold & Richter KG, Munich, Germany
Filed May 8, 1968, Ser. No. 727,389
Claims priority, application Germany, May 17, 1967, A55,731
Int. Cl. G03b 1/22
U.S. Cl. 226—62 3 Claims



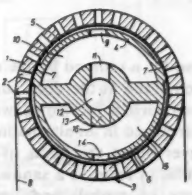
A film feed mechanism for intermittently advancing a strip of perforated film by a plurality of claws arranged in the perforation planes of the film. Each of the plurality of claws defines a plurality of cam slots, a plurality of heart cams are positioned in the cam slots and are mounted on a plurality of shafts. The claws are guided and driven by heart cams mounted on two shafts arranged one behind the other and driven in the same direction with the cams traveling in phase effect to insert the claws into the film perforations by moving the claws in their respective perforation planes in synchronous movement to engage the film simultaneously in the perforations on both sides of the film.

3,587,961
YARN DELIVERY MECHANISM
Helmut Ritter, Canton St. Gall, Switzerland, assignor to Heberlein Patent Corporation, New York, N.Y.
Filed July 15, 1968, Ser. No. 745,017
Claims priority, application Switzerland, Aug. 28, 1967, 12042
Int. Cl. G03b 1/56
U.S. Cl. 226—90 9 Claims



Apparatus for delivery of yarn to textile treating machines comprising means for bringing interacting rollers together at equal surface speeds, maintaining same together at constant preset pressure, and allowing separation of same in the event of serious irregularities in yarn delivery.

3,587,962
SUCTION CYLINDER FOR TRANSMITTING A TORQUE
Peter Herzhoff, Leverkusen; Hans Gref, Cologne-Stammheim; Wolfgang Schweicher; Willi Wasser, Leverkusen; Kurt Browatzki, Opladen; Joseph Friedsam, Langenfeld, and Max Heidenreich, Leverkusen, Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Germany
Filed Dec. 6, 1968, Ser. No. 781,831
Int. Cl. G11b 15/38
U.S. Cl. 226—95 2 Claims



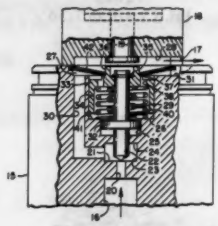
A device for driving a web or strip of material by a rotatable shell in which the strip is held wrapped around the rotating shell by suction applied from within the shell in which the region of contact of the strip on the rotating shell covers more than the limited area of the wrapping region to which the suction pressure is applied. The point of contact of the strip where it runs on to and off the rotating member does not overlie the suction means within the rotating member but overlies a portion of the interior which is connected to the atmosphere. Seals which separate the suction region from the atmospheric region are separated slightly from the annular wall of the rotating member.

3,587,963

COMBINATION BYPASS AND RELIEF VALVE

John W. Meulendyk, and Robert D. Vanderlaan, Kalamazoo, Mich., assignors to Pneumo Dynamics Corporation, Cleveland, Ohio

Filed Mar. 6, 1969, Ser. No. 804,831
Int. Cl. G05d 23/02
U.S. Cl. 236—92 14 Claims



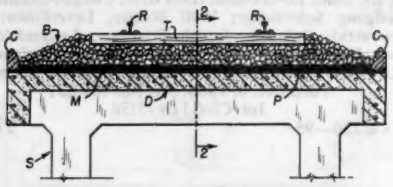
A combination valve parallels a hydraulic servovalve in an actuator system, the combination valve including a single valve seat and cooperable poppet. The poppet is intermediately loaded through a bimetallic member below a certain temperature to provide restricted flow serving to heat the system fluid to a desired operating temperature at which the bimetal is actuated to free the poppet for bypass flow. A solenoid is actuatable to load the poppet against the seat by a pressure-regulating spring to provide closure to a predetermined relief pressure.

3,587,964

PROTECTIVE COURSE FOR BRIDGE DECK

Dale Cork, Elgin, Ill., assignor to W. R. Meadows, Inc., Elgin, Ill.

Filed Apr. 18, 1969, Ser. No. 817,338
Int. Cl. E01b 2/00; E01c 3/00
U.S. Cl. 238—2 9 Claims



A protective course for a railroad bridge deck to be interposed between a membrane at the deck surface and ballast rock thereabove. The course is formed as two layers of sheeting of modular size arranged in an alternating pattern so that the joints of one layer offset the joints of the other layer. Each sheet, rectangular in form, is a sandwichlike construction including a core os asphalt and limestone particles between reinforcing covers of felt web saturated with asphalt and coated with asphalt.

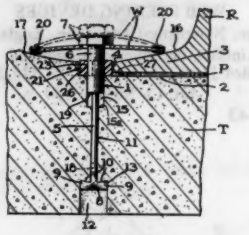
3,587,965

RAIL-TO-TIE FASTENER

John S. Newton, Glen Ellyn, Ill., assignor to Portec, Inc., Chicago, Ill.

Filed Apr. 23, 1969, Ser. No. 818,729
Int. Cl. E01b 9/30
U.S. Cl. 238—349 9 Claims

A spring-type rail fastener which includes a rigid integral tension element insertable through a vertical opening in a tie to flex a compression element bearing on the one hand upon a rail base and on the other hand upon the tie. A locking bar on the tension element cooperates with the tie opening to permit a rapid twist-to-lock assembly of the fastener components.



3,587,966

FREEZING NUCLEATION

Albert C. Zettlemoyer, and David R. Bassett, Bethlehem, Pa., assignors to Lehigh University, Bethlehem, Pa.

Continuation-in-part of application Ser. No. 547,820, May 5, 1966, now abandoned. This application Oct. 10, 1969, Ser. No. 865,398
Int. Cl. A01g 15/00
U.S. Cl. 239—2 20 Claims

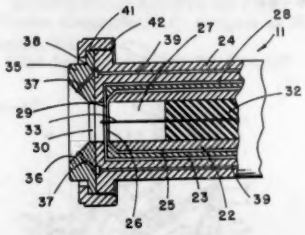
A process of nucleating crystallization of a hydrogen-bonding crystal from a cloud or vapor medium, or a freezing nucleant consisting of an insoluble oxide substrate of suitable particle sizes burned together with sodium or potassium chloride or iodate.

3,587,967

SPRAY COATING APPARATUS

David H. Badger, Indianapolis, Ind., assignor to Ransburg Electro-Coating Corp., Indianapolis, Ind.

Continuation of application Ser. No. 741,374, July 1, 1968, now abandoned. This application Jan. 8, 1970, Ser. No. 3,582
Int. Cl. B05b 5/02
U.S. Cl. 239—15 12 Claims



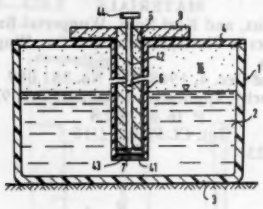
An electrostatic spray gun for forming a spray of air-atomized, electrically charged paint particles comprises a grounded metal barrel having at its forward end a passage within which the spray is formed. Paint is supplied to such passage through a narrow annular paint orifice in the passage wall and is atomized by an airstream directed inwardly and forwardly of the passage from an annular air orifice located immediately rearward of the paint orifice. An ionizing electrode supported in rear of the paint and air orifices extends forwardly on the axis of the passage past the paint orifice and terminates at a point spaced rearwardly from the forward end of the passage. An appropriate voltage source maintains the electrode at elevated potential to create between the electrode and the wall of the passage an electrostatic field through which the spray passes immediately after it is formed.

3,587,968

APPARATUS FOR THE DIFFUSION OF VOLATILE PRODUCTS

Claude Hennart, Aubervilliers; Georges Martin, and Jean Claude Balland, Poitiers, France, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed July 7, 1969, Ser. No. 839,726
Int. Cl. B65d 45/16
U.S. Cl. 239—47 11 Claims



An apparatus for diffusion of volatile liquids into the atmosphere by evaporation is disclosed which comprises a reservoir containing the liquid to be evaporated into which dips a feeder wick joined to an evaporator mounted on a wall of this reservoir; a tube surrounding the wick for at least part of its height, and a destructible closure device interrupting the communication of the interior orifice of the wick tube with the atmosphere before use and means such as a blade operable from the outside to destroy the closure device at the moment of putting the apparatus to use.

The reservoir preferably also carries a tube communicating the gaseous volume inside to the atmosphere, which is preferably sealed off before use in a similar manner as the wick tube and must be opened together with the latter.

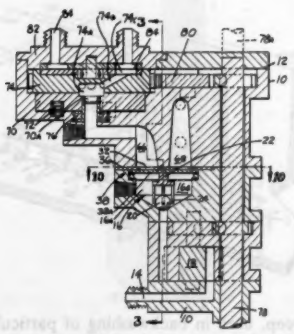
In another modification of the apparatus, the closure device is nondestructible and comprises a sealing plug located in the projection of the feeder wick and which crosses the evaporator, the unit formed by the plug and the wick being slidable between a closure position at which the plug obturates the wick tube and an open position in which the plug is pulled beyond the evaporator, this latter being then in contact with the feeder wick. The entire apparatus can be covered by a hood containing a diffuser wall.

3,587,969

BALANCED FLUID FLOW CONTROL APPARATUS

Carl F. Gromme, P. O. Box 654, Kentfield, Calif.

Filed May 19, 1969, Ser. No. 825,839
Int. Cl. B05b 15/00
U.S. Cl. 239—76 16 Claims



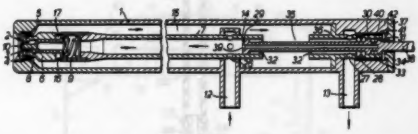
A balanced fluid control apparatus for dividing sources of input fluid supply into at least two variable and controlled parts at least one of which is discharged at predetermined rates of flow to utilizing mechanisms, devices or processes, the rates of flow being controlled to range from minima to maxima, the latter including, in the extreme, the total input fluid as the discharge.

3,587,970

FLUID INJECTORS

David Tindall, Southampton, and Arthur Michael Needham, Backwell, Bristol, England, assignors to J & T Engineers (Ascot) Limited

Filed Apr. 1, 1969, Ser. No. 811,916
Claims priority, application Great Britain, Apr. 2, 1968, 15879/68
Int. Cl. B05b 9/00
U.S. Cl. 239—126 27 Claims



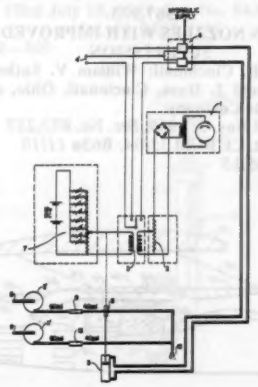
The invention comprises a fluid injector including a changeover valve selectively movable into one position in which to condition the injector for fluid discharge and into another position in which the injector is conditioned for nondischarge but conditioned to accept a continuous circulation of fluid through itself when in said nondischarge condition.

3,587,971

SPRAYING APPARATUS

Alexander Allan Ross, Newport, England, assignor to Fisons Limited, Felixstowe, Suffock, England

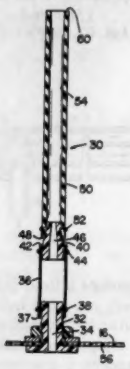
Filed June 9, 1969, Ser. No. 831,450
Claims priority, application Great Britain, June 11, 1968, 27721/68
Int. Cl. B05b 9/06
U.S. Cl. 239—155 12 Claims



An apparatus for spraying chemicals from a vehicle. A water supply and one or more containers for chemicals formulated as solutions or suspensions are provided. The water supply is connected to the spray nozzles through a water supply line, and means is provided to produce a standard pressure in the water supply line. At least one chemical supply line is connected from each chemical container to the water supply line, each chemical supply line being provided with means to produce an excessive pressure drop along it and pressure release means to reduce the flow rate caused by this pressure drop to that required. The pressure release

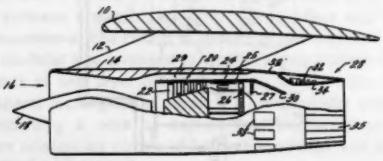
means is adapted to control, according to vehicle speed, the resistance to flow so that the rate of flow of chemical is proportional to vehicle speed.

3,587,972
IRRIGATION SYSTEM
Waldo W. Weeth, P.O. Box 924, Coalinga, Calif.
Filed May 6, 1968, Ser. No. 726,774
Int. Cl. A01g *25/02*
U.S. Cl. 239—212 **4 Claims**



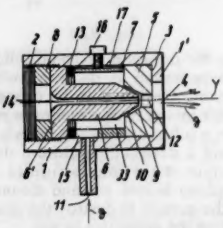
An irrigation system having a plurality of flexible pipes leading from a main pipe into which water is pumped. Each flexible pipe has extending therefrom a plurality of hoses which are of such flexibility, inner diameter, and length that water flowing through the main pipe, through the flexible pipes, and through and from each of the hoses causes each hose to swirl in such a manner as to distribute water flowing therefrom over an area surrounding that hose. Each hose is provided with means which automatically stops the flow of air or water therethrough when air pressure or water pressure within the pipes falls below a specified level.

3,587,973
PROPULSION NOZZLES WITH IMPROVED SOUND SUPPRESSION
Jeremiah P. Wolf, Cincinnati; William V. Sutherland, Milford, and Donald J. Dusa, Cincinnati, Ohio, assignors to General Electric Company
Filed Nov. 3, 1969, Ser. No. 873,217
Int. Cl. B64d *33/04*; B63n *11/10*
U.S. Cl. 239—265.13 **18 Claims**



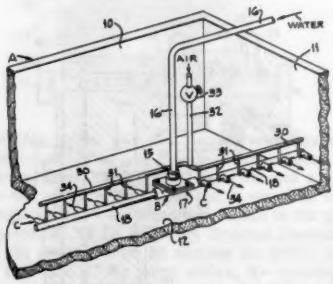
Two forms of sound suppressor for convergent, divergent propulsion nozzles are shown. In both, the flaps of the convergent, primary nozzle are swung to a divergent position in sealing engagement with an end wall having a plurality of tubes through which the hot gas stream is discharged to minimize noise generation. Also in both forms, the suppressor end wall is formed, at least in part, by sectors which are swung to stowed positions in which they form a part of the divergent expansion surface of the nozzle. In one form, the sectors are pivoted from the nozzle structure to form the entire end wall and the flaps forming the remainder of the divergent nozzle are opened outwardly to increase flow of secondary and tertiary air to the rear surface of the end wall. In the other form, the sectors are mounted on a ring which also forms a part of the end wall and the ring is translatable so that it and the sectors can block the hot gas stream and discharge it through blow-in doors to provide reverse thrust. Butterfly valves in the tubes are closed to provide sufficient blockage for reverse thrust.

3,587,974
FEED NOZZLE FOR TRANSPORTING FILAMENTARY MATERIALS
Dieter Rosenkranz, and Karl Bous, Wuppertal-Barmen, Germany, assignors to Plutte, Koecke and Co., Wuppertal-Barmen, Germany
Filed Dec. 4, 1968, Ser. No. 781,097
Claims priority, application Germany, Dec. 9, 1967, P 16 60 592.8
Int. Cl. F23d *11/10*
U.S. Cl. 239—423 **9 Claims**



A nozzle for transporting, with or without concurrent treatment, threads, yarns and similar filamentary materials through entrainment by a fluid stream includes a cylindrical housing with a frustoconical outlet and an axially channeled cylindrical core having a frustoconical front end spacedly nested in that outlet, the width of the gap between outlet and core being determined by a tubular spacer having a lateral cutout in line with a fluid inlet and one or more washers inserted together with the spacer between a rear flange of the core and a front wall of the housing. This front wall may be rotatable relatively to the housing periphery to vary the position of its eccentrically disposed outlet with reference to the housing axis, the core being similarly rotatable and eccentrically mounted on its rear flange.

3,587,975
AERATING ROTARY FILTER SWEEP
John W. Moffett, 126 Chester Pike, Ridley Park, Pa.
Filed June 22, 1970, Ser. No. 48,301
Int. Cl. E03c *1/084*
U.S. Cl. 239—428.5 **3 Claims**



A rotary sweep, used in backwashing of particulate filter beds, preferably of the reactively driven type, is provided with apparatus to cause it to discharge jets of aerated water. Such aerated water enhances the scrubbing action and, when the sweep is reactively driven, increases the reactive forces. Means for aerating the water comprise a plurality of eductors

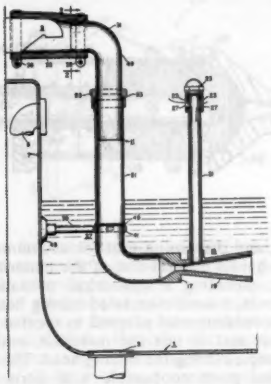
mounted on each of the radially extending sweep arms. These are provided with atmospheric air despite the fact that, during the backwash operation, they are submerged.

3,587,976

TUB-INSTALLABLE HYDROTHERAPY ASSEMBLY

Roy A. Jacuzzi, Oakland, Calif., assignor to Jacuzzi Research, Inc.

Filed Feb. 13, 1969, Ser. No. 799,050
Int. Cl. E03c 1/02
U.S. Cl. 239—428.5 2 Claims



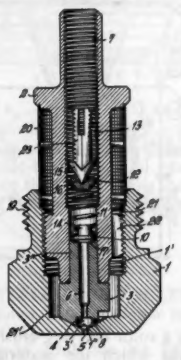
A hydrotherapy assembly for tub installation and utilizing existing water pressure, involving an adjustable telescoping pipe terminating at one end in a hydrojet head assembly, while at its other end, are provided means for suspending the pipe and jet head assembly from the tub associated nozzle and in flow communication therewith. A suction cup bracket mounted on the pipe, is adapted to be anchored to a wall of the tub to stabilize the pipe and jet head assembly, while permitting directional adjustment of the jet head assembly in substantially a horizontal plane.

3,587,977

FUEL INJECTION NOZZLE

Paul Fussner, Sindelfingen; Gunter Hirsch, Kornwestheim, and Dieter Vogt, Stuttgart-Weilimdorf, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Oct. 14, 1969, Ser. No. 866,244
Claims priority, application Germany, Nov. 2, 1968, P 18 06 674.5
Int. Cl. B05b 1/30, 9/00
U.S. Cl. 239—533 9 Claims



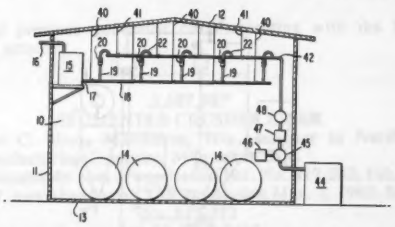
A fuel injection nozzle including a turbulence chamber from which one part of the fuel admitted to the nozzle is injected into a combustion zone through a nozzle opening, while the other part of the fuel is returned from the turbulence chamber to a fuel tank through a return channel provided in the nozzle and controlled by a disc valve; the valve plate of said disc valve is urged into a closed position by an adjustable closing spring engaging the valve plate eccentrically, said valve plate is urged into an open position by the pressure prevailing in said turbulence chamber. When said pressure overcomes the force of said spring, the valve plate is unseated by a tilting motion made possible by said offcenter engagement.

3,587,978

SPACE FUMIGATION SYSTEM

Jesse Douglas Rollow, Jr., 6106 Cromwell Drive, Washington, D.C., and Constant Roosevelt Ray, 2204 Colwyn Road, Richmond, Va.

Filed Dec. 18, 1968, Ser. No. 784,800
Int. Cl. B05b 1/14
U.S. Cl. 239—550 7 Claims



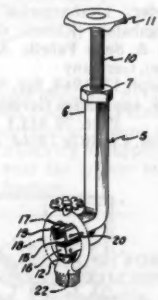
The fumigation of enclosed spaces, and particularly tobacco warehouses, is accomplished by the injection at predetermined intervals of a solution of a dialkyl halovinyl phosphate or of pyrethrum in a trichloroethane, utilizing an automatic dispensing system including means for supplying insecticide solution, a source of compressed air, an insecticide distribution conduit provided with a series of siphon members each fitted with a pneumatic atomizing spray nozzle and connected to the compressed air supply to form a siphon spray system for distribution of the insecticidal liquid in finely dispersed condition.

3,587,979

MANUALLY OPERATED VALVE FOR SPRINKLER HEAD

Andrew Wilson Butts, 3125 S.E. 140th Ave., Portland, Oreg.

Filed July 18, 1969, Ser. No. 843,146
Int. Cl. B05b 1/30
U.S. Cl. 239—569 5 Claims



This invention is a manually operated valve adapted to certain types of recessed and exposed types of sprinkler heads and has as its purpose the manually shutting off of the flow of water or other liquid through the head. The invention consists of an L-shaped piece of steel tubing in which is located a steel bar that is also L-shaped. The underside of the short end of the aforesaid steel tubing is removed in order to permit the steel bar, which is inserted in the steel tubing, to be pushed or pulled in or out of the tubing by means of a manually operated screw, as will hereinafter be described. The upper surface of the short end of the steel tube is configurated to fit the tip of a sprinkler head when this invention

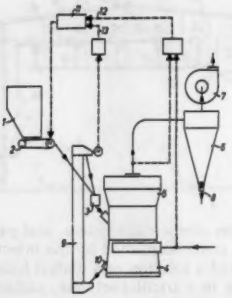
is adapted to the same. The underside of the short end of the steel bar is provided with an adjustable gate that fits in the orifice of the sprinkler head. A dimple in one side of the short end of the steel tubing engages in the recess in one side of the short end of the steel bar when the valve is opened, thus locking the valve in the desired open position.

3,587,980

METHOD OF CONTROLLING THE RATE OF FEED TO AN EXTRANEOUSLY ENERGIZED AIRSWEPT MILL

Heinrich Henne, Ennigerloh, and Peter Tiggesbaumker, Oelde, Germany, assignors to Polysius G.m.b.H., Neubeckum, Germany

Filed Jan. 13, 1969, Ser. No. 790,595
Claims priority, application Germany, Feb. 28, 1968, P 16 07 576.5
Int. Cl. B02c *25/00, 21/00*
U.S. Cl. 241—19 **4 Claims**



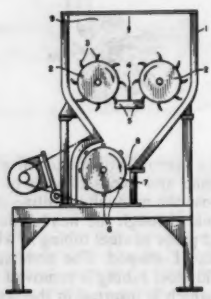
In the controlling of the rate of feed of fresh material to an extraneously energized airswept mill from which only part of the output of material is extracted by the air stream and a further part deposited from the mill is refed mechanically to the mill, a control signal is derived from the degree of fullness of the mill, and a control signal is derived from the amount of material mechanically refed to the mill. One of the two control signals is used to control the nominal or target value of the rate of feed of fresh material, and the other control signal is used to control the actual value of such rate of feed.

3,587,981

PROCESS FOR THE SIZE REDUCTION OF EXPANDED PLASTICS

Leo Unterstenhoefer, Limburgerhof Pfalz, and Wilhelm Krieger, Ludwigshafen (Rhine), Germany, assignors to Badische Anilin & Soda Fabrik, Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Sept. 13, 1968, Ser. No. 759,563
Claims priority, application Germany, Sept. 15, 1967, P 16 79 811.1
Int. Cl. B02c *18/44, 18/06*
U.S. Cl. 241—29 **2 Claims**



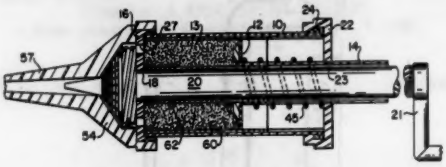
A process for the size reduction of expanded plastics, comprising preliminary size reduction of expanded plastics blocks by shearing action between rollers armed with shear blades and stationary blades and further size reduction by continued shearing action.

3,587,982

ADHESIVE AND SEALANT DISPENSER WITH GRINDING MEANS

Hugh W. Campbell, Xenia, Ohio, assignor to The National Cash Register Company, Dayton, Ohio

Filed Jan. 15, 1969, Ser. No. 791,236
Int. Cl. B02c *19/12;* **G01f** *13/00*
U.S. Cl. 241—62 **17 Claims**



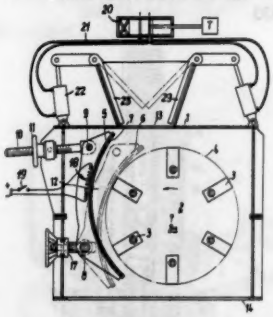
A mixing and dispensing unit for accommodating several materials, wherein at least one of the materials is in an isolated state, including a cylindrical container carrying a plunger therein, a handle-actuated mixing head adjacent one end of the container and adapted to receive materials from the container and to mix the materials, and a nozzle-type dispensing cap covering the mixing head. The one end of the container has ports cooperable with ports in a disc-type dispenser gate on the plunger for metering and for controlling the flow of the materials to the mixing head. The mixing head and the dispensing cap are cone-shaped and include roughened surfaces which work together to rupture the isolated-state material and to mix the materials prior to dispensing the mixture from the unit.

3,587,983

DEVICE FOR CLEANING THE BAFFLE WALLS OF BAFFLE CRUSHING MACHINES

Helmut Ernst Adolf Heinrich, Rheinhausen, Germany, assignor to Fried Krupp Gesellschaft mit beschrankter, Haftung, Essen, Germany

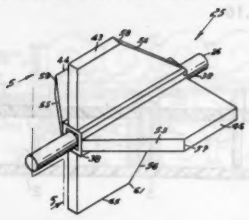
Filed May 27, 1968, Ser. No. 732,284
Claims priority, application Germany, May 27, 1967, P1607448.9
Int. Cl. B02c *13/04, 13/286, 25/00*
U.S. Cl. 241—64 **5 Claims**



A crusher with a rotor carrying crushing tools and with a baffle wall against which the material to be crushed is thrown, in which the baffle wall is at least in part movable toward said rotor to allow the crusher tools of said rotor to clean the baffle walls of deposits which have collected on said baffle wall. Automatic controls act, in response to a timer, to periodically throttle the material feed to the crusher

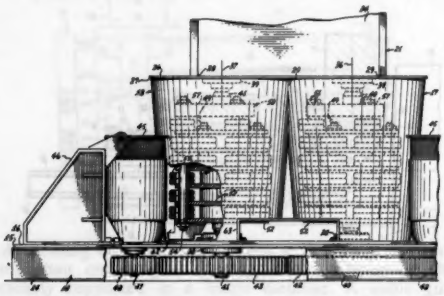
while the baffle is automatically moved toward the rotor for the cleaning action.

3,587,984
GLASS BOTTLE SHATTERING AND GRINDING APPARATUS
Oliver E. Taylor, 204 Jefferson, and Arthur A. Wildenberg, 1103 Riverside Drive, Kaukauna City, Wis.
Filed Sept. 12, 1969, Ser. No. 857,407
Int. Cl. B02c 19/14
U.S. Cl. 241—99 7 Claims



An apparatus for breaking and grinding glass bottles to small fragments comprising an inclined rectangular housing having a paddle wheel-type breaker rotor mounted therein for rotation about a horizontal axis, the rotation of the said rotor and hammer vanes thereon being toward the inclined anvillike bottom side of the housing, said vanes having outside corner portions removed in staggered arrangement to prevent jamming of the rotor and vanes, and said breaker rotor having a mass sufficient to produce a flywheel effect at a preselected speed.

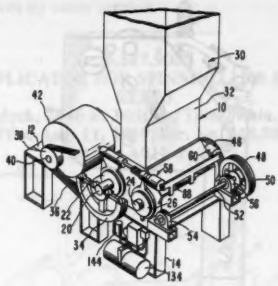
3,587,985
METAL-PROCESSING UNIT
Roy M. Eidal, Albuquerque, N. Mex., assignor to Eidal International Corporation, Albuquerque, N. Mex., Subsidiary of Southwest Factories, Inc.
Filed Jan. 14, 1969, Ser. No. 791,102
Int. Cl. B02c 13/20, 13/14, 18/12
U.S. Cl. 241—138 3 Claims



A processing unit particularly for automobile bodies, sheet metal scrap, and other solid waste, utilizing a pair of rotary compactors placed side-by-side and to open the outer surrounding shell between the two allowing the material passing through the machine access between the two rotors of the compactors.

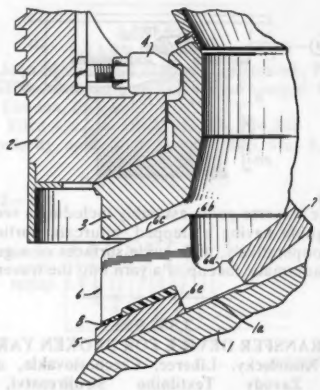
3,587,986
CONTROL SYSTEM FOR ROLLER MILLS
Charles J. Alciati, Alamo, Calif., assignor to Mil Engineering & Machinery Co., Oakland, Calif.
Filed July 26, 1968, Ser. No. 747,880
Int. Cl. B02c 4/06, 4/38
U.S. Cl. 241—231 4 Claims

A grain roller mill including a pair of rotatable rolls between which the grain is milled, a control system comprising a fluid power actuator for applying equal forces to opposite ends of one of the rolls whereby equal rolling pressure is applied by the rolls throughout the length of the rolls, and



a fluid pressure generator communicating with the fluid power actuator.

3,587,987
SEGMENTED CRUSHER LINER
Jerome C. Motz, Milwaukee, Wis., assignor to Nordberg Manufacturing Company, Milwaukee, Wis.
Continuation-in-part of application Ser. No. 617,282, Feb. 20, 1967, now abandoned. This application Mar. 7, 1969, Ser. No. 813,392
Int. Cl. B02c 2/04
U.S. Cl. 241—294 6 Claims

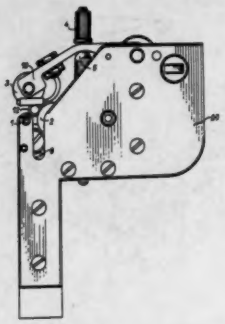


A crusher of the gyrated head-type having a crushing head gyrated beneath or within a bowl. The mantle of the crushing head is formed of facing parts of a metal having a very high resistance to wear and a backing or supporting structure having less resistance to wear but greater tensile strength and adequate resistance to fracture.

3,587,988
CORE HOLDING ARRANGEMENT FOR SHUTTLELESS COIL-WINDING MACHINE
Frantisek Jagos, Prague, Czechoslovakia, assignor to Tesla, narodni podnik, Prague, Czechoslovakia
Continuation-in-part of application Ser. No. 591,875, Nov. 3, 1966, now abandoned. This application May 29, 1969, Ser. No. 828,985
Int. Cl. H01f 41/08
U.S. Cl. 242—4 5 Claims

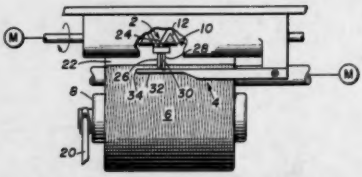
An annular core for a toroidal coil is held in a shuttleless winding machine between two rollers rotated about fixed axes and a third, idling roller mounted on a spring-loaded arm. The core is axially secured on the plastic or rubber-coated rollers by flanges on the same, there being at least three flanges on each roller, each flange being aligned in a common plane with corresponding flanges on the other two

rollers. The free end of the conductor being wound on the core is led from the core over one of the rollers to a spring-



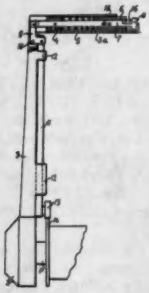
loaded clamp. The spring tension on the roller carrying arm is adjustable, and the arm movement is limited by a stop.

3,587,989
TRAVERSE GUIDE ASSEMBLY
Don E. Fisher, 1525 Texar Drive, Pensacola, Fla., and William R. Osban, P.O. Box 465, 133 Shoreline Drive, Gulf Breeze, Fla.
Filed Feb. 5, 1969, Ser. No. 796,731
Int. Cl. B65h *54/28*
U.S. Cl. 242—18 **6 Claims**



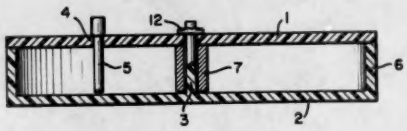
A textile traverse guide assembly including a reciprocating traverse guide having a stepped, bifurcate portion that interacts, cooperatively, with guide surfaces of a guide bar to effect an automatic laceup of a yarn into the traverse guide.

3,587,990
TRANSFER DEVICE FOR BROKEN YARNS
Premysl Kostelecky, Liberec, Czechoslovakia, assignor to Elitex Zavody Textilniho Strojirenstvi, Liberec, Czechoslovakia
Filed Dec. 15, 1969, Ser. No. 889,850
Claims priority, application Czechoslovakia, Dec. 13, 1968, Pr.-8470-68
Int. Cl. B65h *54/22, 69/04;* **B65b** *13/26*
U.S. Cl. 242—35.6R **10 Claims**



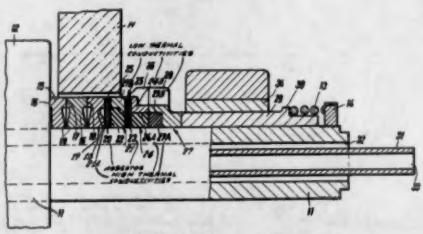
A transfer device for transferring a broken yarn to a knotting mechanism in an automatic winding machine having grippers automatically operated during movement of the device toward a knotting mechanism so that the broken yarn end is gripped, cut, and delivered to the knotting mechanism.

3,587,991
REELS AND REEL-AND-RIBBON ASSEMBLIES
Robert J. Stark, Kehrsatz, Switzerland ((50 Renwick Road, Melrose, Mass. 02176))
Filed Dec. 11, 1967, Ser. No. 689,540
Claims priority, application Germany, Dec. 12, 1966, ST26237
Int. Cl. 242 *74;* **B65h** *75/02;* **G11b** *23/06*
U.S. Cl. 242—55.16 **8 Claims**



A reel for a ribbon of flexible sound-recording magnetic tape, film, punched tape, or the like. The reel has a pair of spaced, parallel reel flanges and core means extends between and is operatively connected with the flanges to hold the latter apart from each other by a distance corresponding to the width of the ribbon which is to be stored between the flanges. This core means supports at least one of the flanges for free rotary movement about the axis of the core means with respect to the other of the flanges, and one of the flanges carries a means for facilitating the winding of a ribbon into the space between the flanges.

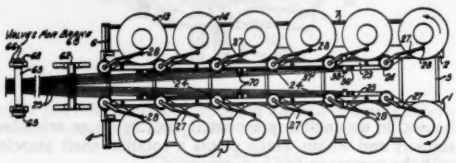
3,587,992
REEL CONSTRUCTION
Artur Seibel, Remscheid, Germany, assignor to Bergische Stahl-Industrie, Remscheid, Germany
Filed Apr. 11, 1969, Ser. No. 815,406
Int. Cl. B21c *47/04;* **F26b** *13/00*
U.S. Cl. 242—78.1 **10 Claims**



A reel construction for high-temperature applications. A shaft is provided through which cooling fluid may be circulated. Bearing means mounts the shaft for rotation. A reel is carried by the shaft spaced from the bearing means and is subjected to elevated temperatures. A pressure-exerting arrangement is provided for preventing axial shifting of the reel relative to the shaft and is in heat-exchanging contact with the bearing means. Annular pressure-transmitting members surround the shaft intermediate the pressure arrangement and the reel in abutment with the latter. These members have relatively large inner circumferential surfaces contacting the outer surface of the shaft and relatively small axial abutment faces contacting the reel or axially adjacent annular member. Intermediate these annular members and the pressure arrangement in pressure-transmitting engagement therewith are intermediate annular members each of which also surrounds the shaft and each of which includes an inner annular section in thermal contact with the shaft and made from a material of high thermal conductivity, and an outer annular section

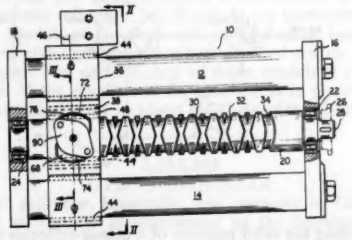
concentric with the inner annular section in thermal contact therewith and made from a material of low thermal conductivity.

3,587,993
APPARATUS FOR COILING METAL BANDS
Marvin M. Tradler, Canfield, Ohio, assignor to Wheeling-Pittsburgh Steel Corporation, Pittsburgh, Pa.
Filed May 21, 1969, Ser. No. 826,401
Int. Cl. B21c *47/02*
U.S. Cl. 242—80 **16 Claims**



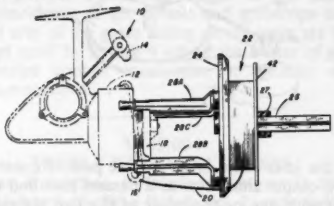
At least one band-receiving reel is rotatably mounted on a vertical axis at each side of a framework having front and rear ends. Between the opposed reels there are vertically reciprocating means for spooling metal bands on the reels, which pull the bands forward from a common source of supply. The spooling means are operated by a hydraulic system that is so constructed and controlled that it lowers the spooling means at the same speed as they are raised, whereby the bands are wound on the reels very evenly.

3,587,994
SPOOLING DEVICE
Donald L. Freed, Jr., Belleville, Ill., assignor to National Mine Service Company, Pittsburgh, Pa.
Filed Dec. 29, 1969, Ser. No. 885,744
Int. Cl. B65h *54/28;* **F16h** *25/12*
U.S. Cl. 242—158.3 **8 Claims**



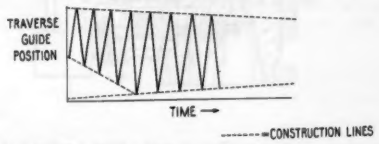
A spooling device for distributing a flexible strand along more than one length of traverse has a spooling shaft rotatably supported in a frame member. A cable guide bracket is slidably mounted on a frame member and has a central rectangular bore therethrough. A spooling nut is mounted in the rectangular bore of the cable guide bracket and the dimensions of the cable guide member rectangular bore are greater than the dimensions of the spooling nut so that the spooling nut floats therein. The spooling nut has a central circular aperture therethrough with a diameter larger than the diameter of the spooling shaft that extends therethrough. Bushings positioned between the shaft and the nut maintain the radial and coaxial relationship of the nut to the shaft. Guide members are positioned in transverse bores in the guide bracket and have portions extending into apertures in the spooling nut. An indexing pin having an inner arcuate surface is positioned in the spooling nut and guide bracket with the inner arcuate surface extending into the threaded grooves of the spooling shaft. A resilient means urges the arcuate surface toward the spooling shaft. The above arrangement provides a floating connection between the spooling nut and the cable guide member so that radial deflection of the guide member relative to the shaft does not transmit destructive radial forces to the spooling shaft from the cable guide bracket. The cable guide bracket deflects radially relative to the spooling shaft when it is subjected to torsional forces by cable tension.

3,587,995
LINE APPLICATOR FOR SPINNING AND SPIN CAST REELS
John S. Haddock, 2646 E. 34th St., Tulsa, Okla.
Filed Aug. 11, 1969, Ser. No. 848,886
Int. Cl. A01k *89/00*
U.S. Cl. 242—84.2 **8 Claims**



An apparatus for applying line without twist onto fishing reels has a frame which carries a spindle for receiving bulk fishing line spools and is releasably coupled to the pickup cylinder of a fishing reel. Each of the legs has an offset base which is received on the frame in such a manner that rotation of the legs effects a circular outline of varying diameter at the terminal ends of the legs to enable one apparatus to be attached to various size pickup cylinders.

3,587,996
YARN PACKAGE
Gwynfryn John Morris, and Michael Tayler Kirk, Pontypool, Great Britain, assignors to Imperial Chemical Industries Limited, London, England
Filed Apr. 26, 1968, Ser. No. 724,338
Claims priority, application Great Britain, May 4, 1967, 20725/67
Int. Cl. B65h *55/00*
U.S. Cl. 242—176 **12 Claims**

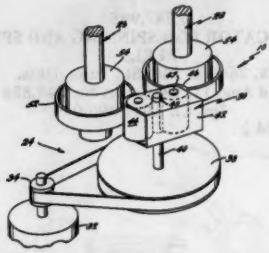


A process for the building of a stable yarn package having a yarn takeoff end and having improved uniformity of mean takeoff tension wherein the yarn is traversed axially of the package in a succession of traverse strokes, the improvement comprising traversing the yarn during winding in a manner such that the percentage of yarn laid by an early traverse stroke on the takeoff side of the midpoint of the yarn package length of the full package has a value of at least 58, gradually adjusting the traverse in a manner to reduce such percentage in succeeding traverse strokes throughout the building of at least a part of the full package, and progressively moving the traverse reversal points opposite said takeoff side toward said takeoff side during the building of at least the last three-quarters of the full package weight.

3,587,997
REVERSING DRIVE MEANS FOR TAPE REELS AND THE LIKE
Robert E. Wood, Ann Arbor, Mich., assignor to Sycor Inc., Ann Arbor, Mich.
Filed Jan. 31, 1969, Ser. No. 795,415
Int. Cl. B11b *15/32;* **G03b** *1/04*
U.S. Cl. 242—201 **11 Claims**

A drive train including a reversible motor having an output shaft coupled to one or the other of a pair of tape drive spindles as a function of the driving direction of the output shaft,

by a drive transmission means including an idler roller held in driving engagement with the motor output shaft by a support bracket pivotal about the axis of the output shaft, such that the support bracket follows the driving direction of the shaft



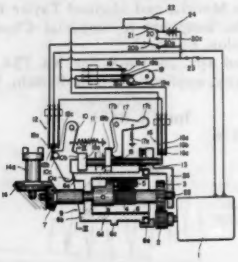
to move the idler roller in an arcuate path of constant radius about the output shaft axis as a center, into and out of engagement with one or the other of the two tape drive spindles.

3,587,998

ELECTRIC WINDING DEVICE FOR CAMERAS

Yoshio Kuramoto, and Kaoru Umeda, Sakai, Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sept. 24, 1969, Ser. No. 860,542
Claims priority, application Japan, Sept. 27, 1968, 43/84886
Int. Cl. B11b *15/32*; G03b *1/04*
U.S. Cl. 242—206 **3 Claims**



An electric winding device for cameras, which is capable of either a continuously shooting mode of operation, or a single-frame shooting mode of operation. The winding device has a power transmission with a differential mechanism to selectively transmit the output power of a motor to either a film takeup shaft or a switch-actuating means. Said differential mechanism includes a cam means and drives a film-winding shaft when the load on the film-winding shaft is smaller than a certain load preapplied to said cam means, while said differential mechanism drives said cam means when said load on the film-winding shaft is larger than said certain load, whereby film-winding, shutter-charging and releasing etc. are attained automatically.

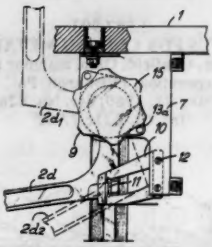
3,587,999

ARTICULATION DEVICE FOR DEPLOYABLE APPURTENANCES ON SPACECRAFT

Wladimir Miniovitch, Le Cannet, and Claude Chenin, Cannes La Bocca, France, assignors to Sud-Aviation Societe Nationale de Constructions Aeronautiques, Paris, France

Filed Mar. 22, 1968, Ser. No. 715,421
Claims priority, application France, Mar. 31, 1967, 100,949
Int. Cl. B64g *1/00*
U.S. Cl. 244—1 **8 Claims**

An articulation device is provided for enabling appurtenances associated with a spacecraft such as an artificial satellite to be deployed and which comprises powered deploying and retracting means and damping means of the deployment motion, the powered and damping means being



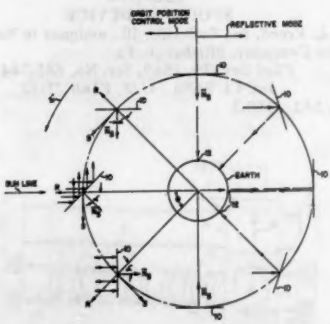
housed in an enclosure mounted directly on an articulation support and within which pivots a rotation shaft associated with the corresponding appurtenance.

3,588,000

ORBIT POSITION CONTROL OF PLANAR REFLECTOR SATELLITES

Arthur G. Buckingham, Baltimore; James A. Miller, Linthicum Heights, and George Shapiro, Annapolis, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 29, 1968, Ser. No. 748,459
Int. Cl. B64g *1/00*
U.S. Cl. 244—1 **3 Claims**



Controlling the orbit position of a planar-reflector satellite orbiting a planet such as the earth and having commandable pitch and roll attitude changing means for aiming such satellite to reflect energy from the sun to a desired area on the planet's surface. By suitable command of the pitch and roll attitude changing means during nonfunctional portions of each orbit cycle the planar reflector is orientated relative to the sun for controlling the net effect of solar pressure thereon per orbit to accelerate, decelerate, or maintain average velocity of the satellite, hence control orbital period and the position of the satellite at corresponding times during successive orbits.

3,588,001

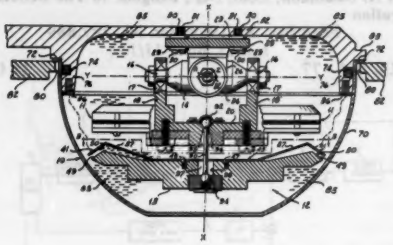
SHOCK-ABSORBING MEANS FOR A FREE PENDULOUS MAGNETIC AZIMUTH DETECTOR MECHANISM

James I. Mitchell, River Edge, N.J., assignor to The Bendix Corporation

Filed Feb. 5, 1969, Ser. No. 796,663
Int. Cl. B64d *43/00*
U.S. Cl. 244—1 **13 Claims**

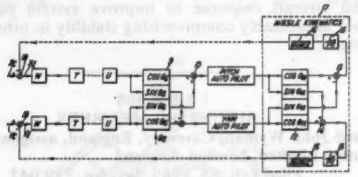
A shock-absorbing means for a free pendulous magnetic azimuth detector mechanism in which a stop carried by a base member serves to limit the motion of the free pendulous

mechanism while novel resilient means cooperatively arranged between the pendulous mechanism and the base



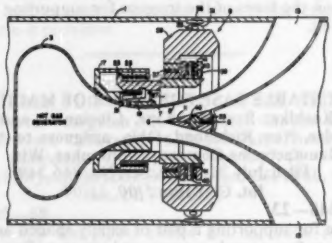
member provides a viscous damping and rapid spring return in a low-volume, high-energy absorbing package.

3,588,002
ADAPTIVE MISSILE GUIDANCE SYSTEMS
Albert J. White, 56, Waysbrook, Letchworth, Hertfordshire, England
Filed Oct. 24, 1967, Ser. No. 678,490
Int. Cl. F42b *15/02*
U.S. Cl. 244—3.14 **5 Claims**



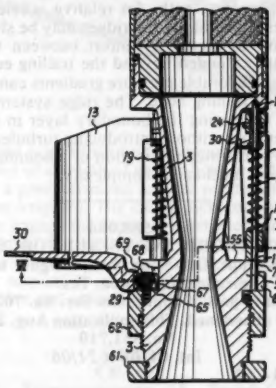
A missile guidance station including a resolver for modifying pitch and yaw demand signals in accordance with an assumed missile roll angle, which signals are transmitted to the missile. Models of the pitch and yaw guidance loops at the station receive signals representing required missile pitch and yaw angles. The performance of these models is compared with that of the missile and the differences in pitch and yaw performance are used to adjust the angle of the resolver.

3,588,003
GYRO CONTROLLER
James V. Johnston, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army
Filed June 3, 1969, Ser. No. 830,047
Int. Cl. F42b *15/18*
U.S. Cl. 244—3.22 **4 Claims**



A missile system having a gyroscope control mechanism for providing the balancing torque required to maintain a spinning missile on its predetermined flight course. The system includes a missile having a center of gravity, an axis, a throat for emitting hot gases into opposed exhaust ports. The control mechanism for the system includes a gyroscope having a spin axis disposed for coincidence with the missile axis. A ring in the gyroscope mounts a gimbal shaft that is disposed across the throat and in normal relation to the axis of the missile. A splitter vane is secured to the gimbal shaft in the throat to increase the flow of hot gases through one of the exhaust ports when a disturbing torque has caused the missile axis to be out of coincidence with the gyroscope axis. This increase flow of hot gases through one of the exhaust ports will provide a restoring torque to the missile and restore coincidence of the missile and gyroscope axes. The movement arm of the gases acting on the vane are balanced out or kept small by having it act on the center of gravity of the gyroscope control mechanism to thereby eliminate gyroscope precession.

3,588,004
MISSILE WITH BRAKE FLAPS
Xaver Suter, Ruschlikon, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland
Filed Aug. 27, 1968, Ser. No. 755,526
Claims priority, application Switzerland, Sept. 11, 1967, 12667
Int. Cl. F42b *13/32*
U.S. Cl. 244—3.27 **5 Claims**

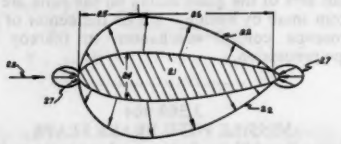


A missile having a brake flap movable out from a normal position into an operating position against an adjustable stop. A latch member secures the flap in the operating position from any lifting off from the stop. A wedge-shaped member is arranged between the missile body and a cylindrical hub on the flap so that when the flap is lifted off the stop the friction between the hub and the wedge-shaped member urges the wedge-shaped member in between the body and the hub. A spring urges the wedge-shaped member between the body and the hub.

3,588,005
RIDGE SURFACE SYSTEM FOR MAINTAINING LAMINAR FLOW
Scott C. Rethorst, Pasadena, Calif.
Filed Jan. 10, 1969, Ser. No. 790,351
Int. Cl. B64c *23/00*
U.S. Cl. 244—41 **5 Claims**

In many applications where fluid flows over a solid surface, or where a body moves through a fluid medium, laminar, rather than turbulent or separated, flow is desirable. Friction in the fluid boundary layer in combination with an adverse pressure gradient can cause turbulence or separation even on a very smooth surface. An adverse pressure gradient exists on the aft portion of most bodies due to the deceleration of fluid which has been accelerated over a convex forward portion. The present invention creates paths of

relatively favorable pressure gradient by providing a system of smooth ridges shaped and located such that they accelerate cross flow components as well as the flow in the free stream direction. The ridges sweep some of the outer flow into the boundary layer to energize the layer in an orderly fashion. The flow in the boundary layer is accelerated over the ridges because of boundary layer thinning and because the ridges have less curvature than the surface. Therefore, the ridges cause less deceleration of the free stream components than



the surface, creating paths for relative acceleration of flow up the ridges. In addition, the ridges may be shaped in lateral cross section to create a venturi between two ridges. If the ridges are extended beyond the trailing edge of the surface relatively favorable pressure gradients can be maintained to the surface trailing edge. The ridge system performs the function of energizing the boundary layer in the manner of vortex generators without introducing turbulence. The ridge system also performs the function of a boundary layer bleed system without mechanical complexity.

3,588,006

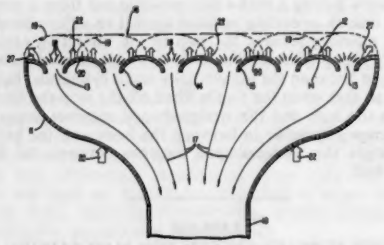
DEVICE FOR PRODUCING USEFUL FORCES IN FLUIDS

Douglas F. Koeppe, Galveston, Tex., assignor to Twenty-First Century Corporation, Galveston, Tex.

Continuation-in-part of application Ser. No. 702,086, Jan. 31, 1968, now abandoned. This application Aug. 20, 1969, Ser. No. 851,710

Int. Cl. B64c *21/06*

U.S. Cl. 244—62 **6 Claims**



A device or machine which, when operating in a fluid such as air or water, produces at and contiguous with the operating or working face thereof a substantially flat and homogeneous boundary layer of fluid in which the pressure is significantly lower or higher than the prevailing pressure or pressures in the surrounding fluid in which the device is operating. The device may be a part of any craft, ship, vehicle or other body and the useful force created at said boundary layer of fluid may be utilized to provide lift, control, translation in any direction, or to overcome prevailing forces effecting any craft, ship, vehicle or the like.

3,588,007

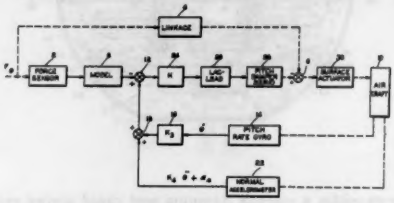
FIXED GAIN PASSIVE ADAPTIVE AIRCRAFT CONTROL SYSTEM

Erwin A. Naumann, Lodi, N.J., assignor to The Bendix Corporation

Filed Dec. 30, 1968, Ser. No. 787,889

Int. Cl. B64c *13/18*

U.S. Cl. 244—77 **11 Claims**



An aircraft control system including a constant high-gain feedback loop for forcing aircraft response to follow a desired response and thereby insuring adequate handling stability over a wide range of flight conditions. Acceleration sensors are located forward of the center of gravity of the craft for sensing angular as well as linear acceleration to permit a higher gain then would otherwise be the case and a filter provides a higher gain in the frequency range of the desired aircraft response to improve system performance without appreciably compromising stability in other frequency ranges.

3,588,008

MOUNTING MEMBERS

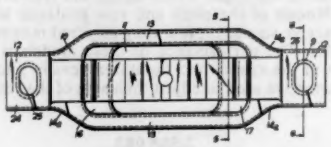
Howard John Wyman, Coventry, England, assignor to Rootes Motors Limited, London, England

Filed Feb. 13, 1969, Ser. No. 799,042

Claims priority, application Great Britain, Feb. 16, 1968, 7824/68

Int. Cl. B60k *9/00*

U.S. Cl. 248—15 **1 Claim**



A mounting member for supporting a transmission unit in a vehicle body comprising a rectangular metal plate having spaced holes for receiving bolts and having a central rectangular aperture formed by cutting and bending tongues from opposed ends of the aperture, the plate having a rubber covering bonded on opposite faces thereof, said cover surrounding the bolt holes and also providing thick rubber cushions on the faces of the tongues for supporting the transmission unit.

3,588,009

ADJUSTABLE BASE FOR A PAIR OF MACHINES

Earl L. Koehlke; Bruce R. Lipe, Cincinnati, and Earle E. Schroeder, New Richmond, Ohio, assignors to Allis Chalmers Manufacturing Company, Milwaukee, Wis.

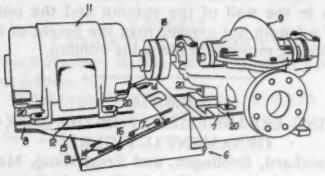
Filed July 31, 1969, Ser. No. 846,349

Int. Cl. F16m *5/00, 11/04*

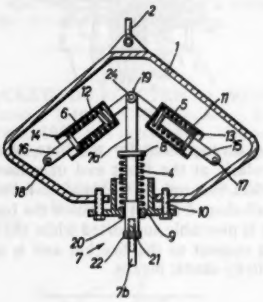
U.S. Cl. 248—23 **2 Claims**

A base for supporting a pair of axially spaced and aligned machines as for example a pump and a motor. One portion of the base has a first inclined surface with longitudinally extending slots therein. A plate having a complimentary inclined surface is bolted to the first inclined surface and the slots permit adjustment of the plate to different vertical posi-

tions. The plate is also provided with a horizontally disposed surface having longitudinally extending slots. One of the machines, usually the motor is bolted to this horizontal surface and the other machine is bolted to another horizontal surface provided on the base. The longitudinal slots permit axial adjustment of the motor relative to the pump.



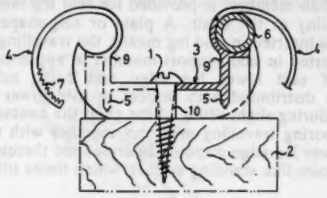
3,588,010
SPRUNG PIPE SUPPORT
Gerhard Liesegang, Hamburg, Germany, assignor to LISEGA Rohrleitungszubehor G.m.b.H., Hamburg, Germany
Filed Oct. 23, 1969, Ser. No. 868,821
Claims priority, application Germany, Nov. 2, 1968, G6804986
Int. Cl. F16l *3/16*
U.S. Cl. 248—54 **9 Claims**



A sprung pipe support comprises a drawbar carrying the pipe weight and engaging a vertical pressure spring and connected to two transverse pressure springs which are pivotable about horizontal axes, the transverse springs being connected to the drawbar at a joint located above the vertical spring which is mounted between a fixed thrust block on the drawbar and a displaceable thrust block which is adjustably connected to the casing by screws. The drawbar includes an adapter sleeve coupled to the joint and a lower part threaded in the sleeve and accessible externally of the casing, the joint carrying a bolt extending through a slot in the casing along which a scale is provided.

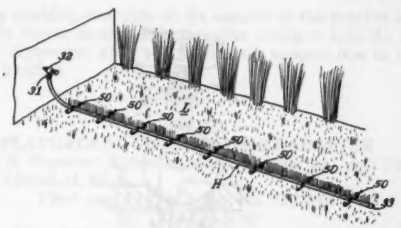
3,588,011
HOLDER CLIP FOR PIPES, CABLES, ETC.
Axel Gote Peres, Vasagatan 3B, 79500 Rattvik, and Lars Bert Ronald Ericson, Vallavagen 16, 79100 Falun, Sweden
Filed Jan. 24, 1969, Ser. No. 793,741
Claims priority, application Sweden, Jan. 25, 1968, 977/68
Int. Cl. F16l *3/08*
U.S. Cl. 248—68 **1 Claim**

A holder clip for pipes, cables etc. is made of plastic material and intended for fixation to a support by means of a fastening element. The plastic clip comprises a rigid body by which the holder clip is secured to the support and which has at least one projection directed towards the support, and a flexible portion extending from the body to embrace the pipe, cable etc., said flexible portion having the end formed



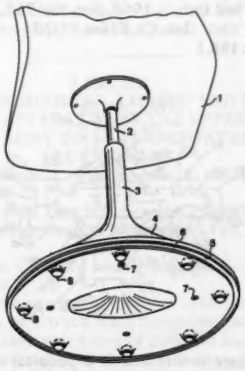
with at least one hook means for engagement with the projection directed towards the support.

3,588,012
SOAKER HOSE SUPPORT CLAMP
Edward E. Schaefer, 1134 Oak Knoll Drive, Lake Forest, Ill.
Filed Aug. 6, 1968, Ser. No. 750,526
Int. Cl. B05f *13/02*
U.S. Cl. 248—80 **18 Claims**



A soaker hose support clamp for supporting and retaining at least a portion of a length of soaker hose in a desired location on and at a predetermined angular position with respect to an area to be irrigated. The clamp includes a support portion adapted to engage the area to be irrigated, and a mounting portion carried by the support portion and adapted to retain a portion of an associated soaker hose in a plurality of positions with respect to the support portion including a horizontal position and at least one inclined position.

3,588,013
CHAIR
Laszlo Mazak, Tennmoosstrasse 15, Zurich-Gockhausen, Switzerland
Filed Sept. 16, 1968, Ser. No. 760,028
Claims priority, application Switzerland, Oct. 3, 1967, 13769/67
Int. Cl. F16m *11/22*
U.S. Cl. 248—158 **1 Claim**



There is disclosed a chair, especially an office chair, incorporating a formed leg means having a lower leg edge from

which said leg means is inwardly retracted, said leg means providing an essentially circular-shaped support surface. A plurality of inset-disposed travelling members in the form of roller or ball members is provided for said leg means to impart mobility to the chair. A plate or ring-shaped support member is inserted in said leg means, the travelling members being inserted in said support member at approximately the region of said lower leg edge and being substantially uniformly distributed with respect to said lower leg edge, whereby during slight tilting of the chair the contact surfaces of neighboring travelling members together with the region of the lower leg edge disposed intermediate thereto provides a three-point-like standing surface which limits tilting of the chair.

3,588,014

INSTRUMENT MOUNT

Clifton G. Reed, 1322 Canterlane, Houston, Tex.

Continuation of application Ser. No. 811,183, Mar. 27, 1969, now abandoned. This application Aug. 29, 1969, Ser. No. 854,239

Int. Cl. F16m *11/12*; G01c *5/02*

U.S. Cl. 248—180 **4 Claims**

A leveling and sighting instrument for use in the leveling of foundations or other leveling operations including an annular element having a rounded peripheral edge portion engaging a supporting rim of an annular head and supporting such head at an elevation above the ground with the rim disposed substantially in a horizontal plane.

3,588,015

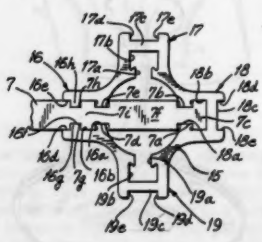
PEDESTAL CONSTRUCTION

Sigmund Bereday, 11 Suchville, Bayamon, P.R.

Filed Oct. 7, 1968, Ser. No. 765,395

Int. Cl. F16m *11/20*

U.S. Cl. 248—188.1 **9 Claims**



The disclosure is directed to a pedestal comprising a hollow column with beams extending outwardly from at least one end and characterized by a construction requiring only saw cuts to prepare the parts for assembly. The hollow column is a length of extruded metal formed with longitudinally extending and rectangular-shaped openings therein with open-ended saw-cut slots in the wall overlying the openings. The beams are bars having opposed saw-cut slots forming rectangular ends. The beams are assembled by sliding the rectangular end of each beam into one of the open-ended slots in the wall of the column and the open-ended slots are of a length not greater than the height of the beam to limit its sliding movement along the column.

3,588,016

MOUNTING ARRANGEMENT FOR THE BASE OF AN ORNAMENTAL FIGURE

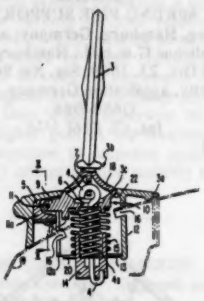
Theodor Reinhard, Boblingen, and Ernst Haug, Maichingen, Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany

Filed Dec. 27, 1968, Ser. No. 787,319

Claims priority, application Germany, Dec. 29, 1967, D54981

Int. Cl. B60r *27/00*

U.S. Cl. 248—204 **32 Claims**



A mounting arrangement for the base of an ornamental figure, particularly at the front end of a motor vehicle, in which a bracket secured at the vehicle includes a bearing part with a ball-shaped socket on which the base of the ornamental figure is pivotably supported while the bearing part is movable with respect to the bracket and is supported with respect thereto by elastic means.

3,588,017

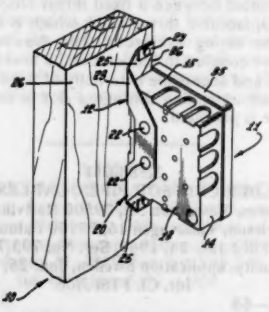
NAIL BRACKET FOR ELECTRICAL BOXES

James O'Brien, Palos Verdes Peninsula, Calif., assignor to Norris Industries, Inc., Los Angeles, Calif.

Filed Oct. 23, 1969, Ser. No. 868,719

Int. Cl. H02g *3/08*

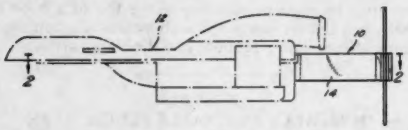
U.S. Cl. 248—205 **9 Claims**



A metal nail bracket for electrical boxes which embodies a flat plate attached to the bottom of a box with arms extending obliquely outward of a sidewall of the box, the arms being bent at a 90° angle to form wings which continue the outward

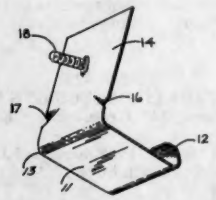
extension, the wings embodying acute folds at their outer ends, with nail holes slightly misaligned formed through the folds for retaining nails in the folds, the nails when driven into a building structure flattening out the folds and wedging the nail therein.

3,588,018
MOUNTING ASSEMBLY
Willis Edward Harlow, Herrin, Ill., assignor to Fedders Corporation, Edison, N.J.
Filed Sept. 19, 1969, Ser. No. 859,275
Int. Cl. A47f *5/00*
U.S. Cl. 248—223 **5 Claims**



A mounting bracket comprising a pair of arms biased apart extending outwardly from the structure to be mounted. The bracket further includes a first tab affixed to each of the arms extending generally perpendicular to the associated arm and a tip portion affixed to each of the tabs spaced apart from the arm and extending generally perpendicular to the tab toward the structure. The bracket is adapted to be used with a wall member provided with two pairs of spaced apart apertures. The first pair of apertures is spaced apart a distance somewhat less than the distance between the arms and the second pair of apertures is spaced apart a distance substantially equal to the distance between the tips.

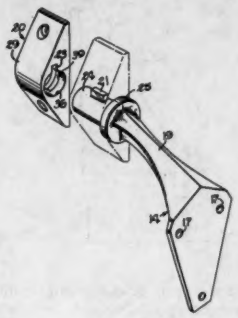
3,588,019
BRACKET FOR ELECTRICAL BOXES
Anthony J. Cozeck, 2410 S. Calle Cordova, Tucson, Ariz.; Ruben Q. Otero, 4956 S. Liberty Ave., Tucson, Ariz., and Walter E. Pierce, 11822 E. Wagon Trail Road Rte #2, Box 812-D, Tucson, Ariz.
Filed July 7, 1969, Ser. No. 839,387
Int. Cl. H02g *3/08*
U.S. Cl. 248—228 **5 Claims**



A bracket made of thin spring sheet steel carries a hook on the end of one leg and an inward 90° bend on the other. The length of this leg is sufficient to span the edge of a metal stud used in building construction. A second leg extends in the direction of the stud width, and is provided with teeth so that, once the bracket is snapped onto a stud the bracket cannot be moved or removed. Means are provided for attaching an electric outlet box or an expandible bar hanger to the bracket.

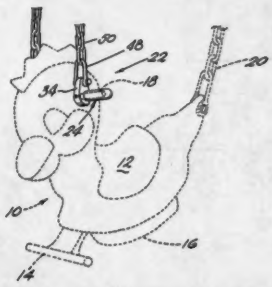
3,588,020
HAND RAIL BRACKET ASSEMBLY
John I. Newcomer, Rockford, Ill., and Martin R. Lambertz, New Hamberg, Ontario, Canada, assignors to Amerock Corporation, Rockford, Ill.
Filed Apr. 16, 1969, Ser. No. 816,553
Int. Cl. A47b *97/00*
U.S. Cl. 248—225 **7 Claims**

For supporting an inclined hand rail on a wall alongside a flight of stairs, a bracket assembly includes a stationary bracket anchored to the wall and mounting a tiltable rail support which may be turned on the bracket to an angular position corresponding to the inclination of the rail. The bracket and support are formed with a complementary key and



keyway enabling assembly of the support to the bracket with a simple slip-on motion and thereafter acting to hold the two against separation while still leaving the support free to turn on the bracket.

3,588,021
PLAYGROUND SWING SUPPORT ADAPTER
Robert S. Wormser, Hillsdale, Mich., assignor to Game-Time, Inc., Litchfield, Mich.
Filed Aug. 13, 1968, Ser. No. 752,314
Int. Cl. A63g *9/00*
U.S. Cl. 248—317 **5 Claims**

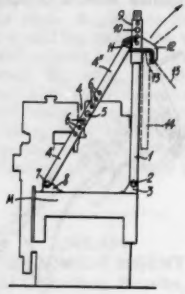


An adapter for playground equipment which permits playground equipment utilizing cantilever-type handgrips to be suspended from chains, links, ropes or the like, without modification to the playground equipment itself.

3,588,022
DEVICE FOR HOOKING, LIFTING AND FIRMLY HOLDING AN APPARATUS ON THE UPPER EDGE OF THE CARGO BODY TO BE TRANSPORTED BY THE TRUCK ITSELF
Domenico Domenighetti, Via Nosetto 6, 6500 Bellinzona, Switzerland
Filed Feb. 10, 1969, Ser. No. 798,009
Claims priority, application Switzerland, Feb. 12, 1968, 2207/68
Int. Cl. A47g *29/00*; **E04g** *3/10*
U.S. Cl. 248—360 **2 Claims**

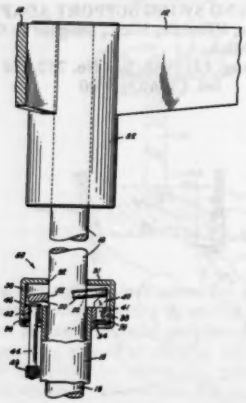
A support for the vertical loads from vehicles, as by hooking over the edge of a truck wall, comprises two pairs of tie rods, the rods of each pair being of different lengths and one of the rods being vertical and the other inclining downwardly from the upper end of the vertical rod, the rods at their lower ends being pivotally interconnected with the load to be carried. The upright rod of each pair has a sleeve vertically ad-

justably mounted thereon, the sleeve carrying a hook on one side which hooks over the upper edge of the vehicle wall. On



its other side, the sleeve is pivotally interconnected with the longer leg. The longer leg is adjustable as to length.

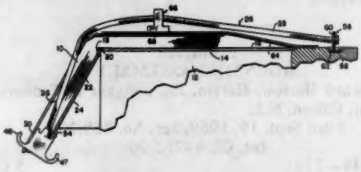
3,588,023
VERTICALLY ADJUSTABLE STANDARD
Maurice Cohen, 3580 N.W. 52nd St., Miami, Fla.
Filed Sept. 16, 1968, Ser. No. 762,287
Int. Cl. F16b *7/16*
U.S. Cl. 248—410 **1 Claim**



A vertically adjustable standard including a tubular member through which a rod is telescopically received and vertically movable therein, said rod being freely movable in an upward direction with respect to the tubular member but being restricted from downward movement with respect thereto. A collar is secured around the tubular member and a locking ring is located within the collar and has an axial opening through which the rod extends. An externally accessible adjustment member is provided for tilting the locking ring within the collar to locate the axis of the locking ring in inclined relation with respect to the axis of the rod, wherein opposed inner edges of the locking ring opening through which the rod extends engage adjacent surfaces of the rod to lock the rod in a selected vertical position against downward movement.

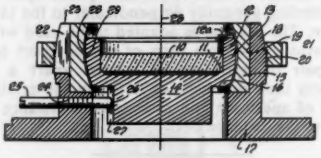
3,588,024
RESILIENT BOOK COPIER CLAMP
Louis Bentzman, Levittown, Pa., assignor to Electrocopy Corporation, Philadelphia, Pa.
Filed Apr. 28, 1969, Ser. No. 819,767
Int. Cl. G03b *27/62;* **A47g** *1/00*
U.S. Cl. 248—451 **9 Claims**

A resilient book-copier clamp comprising a length of resilient cord terminating at each end thereof in a copy machine clamp grip. A clamp retainer medially positions upon the cord for removable engagement within the copy machine construction and a clamp pressure bar affixes to the cord intermediate the said clamp retainer and end positioned



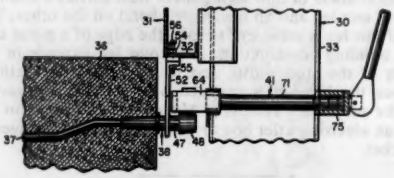
clamp grips to exert pressure upon the top of a book being copied when the resilient cord is stretched between the copy machine affixed clamp retainer and the clamp grips.

3,588,025
OPTICALLY ALIGNABLE BENCH MARK
Jerome Gersman, Bronx, N.Y.
Filed Jan. 16, 1970, Ser. No. 3,411
Int. Cl. A47g *1/24;* **F16c** *11/06*
U.S. Cl. 248—481 **5 Claims**



An optical mirror is supported by the inner member of a spherical bearing whose outer race is in turn supported by a split cylindrical member. A locking ring retainer nut is threaded on the outer surface of the member for tightening the outer member against the inner member, the race surfaces being knurled to provide positive locking therebetween. A boss extending downwardly from the inner member and held in position by four equally spaced adjusting screws contacts the outer surface of the boss. By movement of these screws, the vertical position of the boss and the bearing (with the mirror) is adjusted about the center.

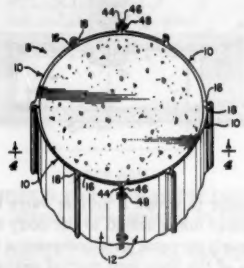
3,588,026
TWO-STAGE FORM-SECURING SYSTEM
Chester I. Williams, 347 Greenbriar, S.E., Grand Rapids, Mich.
Filed May 27, 1968, Ser. No. 732,198
Int. Cl. E04g *11/22*
U.S. Cl. 249—10 **14 Claims**



A system for securing forms preparatory to pouring concrete, in which the form structure is held in place by forces transferred through an inner bolt section engaging an embedded anchor, an outer bolt section vertically engageable with the inner bolt section, a cam mounted on the outer bolt section, a bracket supporting the cam and movably mounted on the form, preferably a secondary interlock between the outer bolt section and the bracket, and an adjusting device for applying forces between the form and the bracket at large

mechanical advantage to generate stress in the bolt section and hold the form firmly against the face of the set concrete of the previous pour.

3,588,027
FLEXIBLE CONCRETE COLUMN FORM PANEL
George F. Bowden, Northbrook, Ill., assignor to Symons Mfg. Company, Des Plaines, Ill.
Filed Jan. 17, 1969, Ser. No. 792,056
Int. Cl. E04g *13/02*
U.S. Cl. 249—48 1 Claim

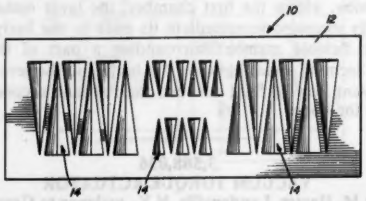


An extended circular column form panel formed of flexible sheet material and adapted, when positioned in edge-to-edge relationship with similar panels, to form a cylindrical column form within which wet concrete may be poured. Novel releasable interlocking edge connections between adjacent panels facilitate rapid assembly and disassembly of the panels upon one another by way of a transverse swinging movement.

3,588,028
COATED METAL MOLD
Harumichi Okamoto; Toshio Shikata, and Kazuo Magaribuchi, Yokohama-shi, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan
Filed June 30, 1969, Ser. No. 837,915
Claims priority, application Japan, July 5, 1968, 43/46527
Int. Cl. B22c *3/00*
U.S. Cl. 249—116 3 Claims

A metal mold having a mold cavity for casting metals therein, the wall of which comprises a substrate made of cast iron or mild steel, an intermediate layer about 30 to about 100 microns thick formed on the surface of said substrate and containing about 6 to about 12 percent by weight of silicon diffused therein and a layer to nickel-aluminum or nickel-chromium alloy deposited on the surface of said intermediate layer by means of plasma spraying or flame spraying.

3,588,029
PLURAL ARTICLE FORMING MOLD
Cyril Hinds, Lafayette, La., assignor to Oil Center Research, Inc.
Filed Aug. 31, 1967, Ser. No. 664,698
Int. Cl. B28b *7/06*
U.S. Cl. 249—127 1 Claim

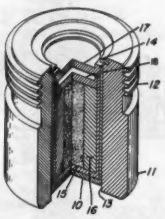


A tray mold for freeze-molding a plurality of trihedral units of a food seasoning adapted to be utilized to assist in flavoring foods during the cooking, marinating, etc. thereof.

3,588,030
APPARATUS FOR PRINTING EITHER CONTINUOUS OR PREDETERMINED LENGTHS OF FILM
Clark Vinton Hile, Pleasant Gap; Richard L. Marks, and Edward E. Headington, State College, Pa., assignors to HRB-Singer, Inc., State College, Pa.
Filed Nov. 14, 1968, Ser. No. 775,718
Int. Cl. G01n *21/34, 23/04*
U.S. Cl. 250—65T 9 Claims

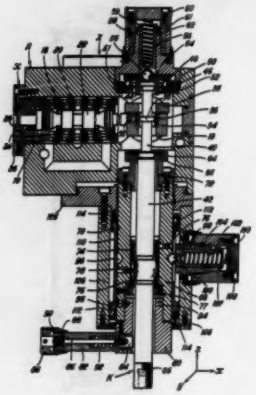
Apparatus for printing either continuous or predetermined lengths of film wherein a positive film and a negative film forming a laminate structure is forced against a heated platen whereby the image is transferred from the negative film to the positive film. The length of the lamination is determined by the position of a traveling pressure roll and associated keeper roll mounted on a carriage adapted to be moved lengthwise of the films, the point of separation or delamination of the films being determined by the longitudinal disposition of the carriage relative to the heated platen.

3,588,031
INTERNALLY SHIELDED TELETHERAPY SOURCE
Norman C. Howard, Fremont, and Lawrence E. Wilkinson, Livermore, Calif., assignors to General Electric Company
Filed Jan. 24, 1969, Ser. No. 793,699
Int. Cl. G21h *5/00*
U.S. Cl. 250—106 9 Claims



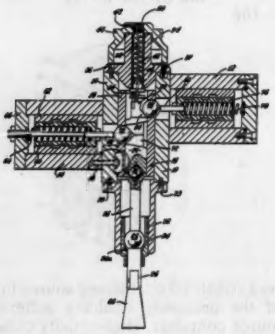
An improved cobalt-60 teletherapy source in which at least a portion of the necessary shielding material is included within the source container. High-activity cobalt-60 material is enclosed within a ring or cup-shaped shielding member within a double-walled stainless steel encapsulating container. The exterior dimensions of this container are such as to fit within a source capsule holder. Preferably, the internal shield in intimate contact with the cobalt-60 has a wall thickness of from about 0.3 to about 0.7 centimeters and comprises uranium or tungsten metal or an alloy thereof. This arrangement permits the use of higher activity cobalt loadings in standard teletherapy machines. Also, this permits more effective use of the radiation and more accurate and effective radiation therapy.

3,588,032
HYDRAULIC MASTER
Angelo Girola, P. O. Box 341, Busto Arsizio, Varese, Italy
Filed Sept. 10, 1968, Ser. No. 758,840
Claims priority, application Italy, Sept. 16, 1967, 20543 A/67
Int. Cl. B23q *35/16*
U.S. Cl. 251—3 9 Claims



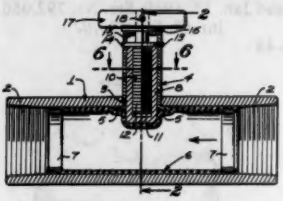
A hydraulic tracer which includes a feeler engageable against the profile of the pattern and acting on two or three distributors perpendicularly arranged to each other, the movable equipment of said distributors being driven by the above-mentioned feeler through a flexible rod.

3,588,033
TRACER CONTROL MECHANISM
Kaiji Negoro, Montebello, Calif., assignor to Whittaker Corporation, Los Angeles, Calif.
Filed Aug. 16, 1968, Ser. No. 754,753
Int. Cl. B23q *35/18*
U.S. Cl. 251—3 7 Claims



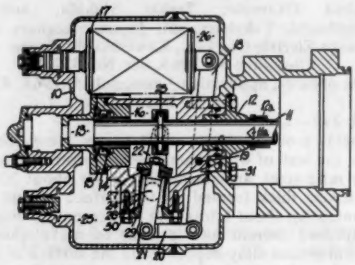
A tracer control mechanism which is intended to be used in conjunction with an hydraulically operated machine tool, such as a milling cutter tool, or other type of cutter or shaper, and by which the tracer mechanism hydraulically controls the movement of the machine tool, is described. The disclosure is particularly concerned with an improved speed control for such a tracer mechanism.

3,588,034
SHUTOFF VALVE
Jonathan S. Powell, 1231 Brookmere Road, Pasadena, Calif.
Filed Jan. 22, 1969, Ser. No. 793,029
Int. Cl. F16k *7/06*
U.S. Cl. 251—8 1 Claim



A shutoff valve in which a tubular valve body is provided with an elastomer lining sealed to the body at its extremities, and a transversely movable gate compresses the liner to force opposed walls of the liner into mutual engagement and form a seal.

3,588,035
LIQUID FUEL CONTROL APPARATUS FOR GAS TURBINE ENGINES
Joseph Lewis Bloom, Baie D'Urfe, Quebec, Canada, assignor to Joseph Lucas (Industries) Limited, Birmingham, England
Filed Dec. 11, 1968, Ser. No. 783,010
Int. Cl. F16k *31/165*
U.S. Cl. 251—61 4 Claims

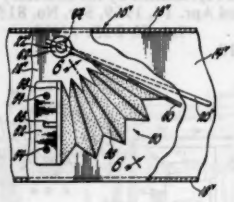


Apparatus for controlling fuel supply to a gas turbine engine comprising a body defining first and second chambers, an inner apertured tube extending through the first chamber, the axial position of the tube determining the flow of fuel to the engine, pressure responsive means in the second chamber in the body, lever means pivotally connected at one end to the pressure responsive means and at the other end to the inner tube, within the first chamber, the lever means being pivotally mounted intermediate its ends to the body, and a tubular flexible member surrounding a part of the lever means forming a seal between the body and the lever means to prevent flow of fluid between the first and second chambers in the body.

3,588,036
VACUUM TORQUE ACTUATOR
Robert M. Harter, Lyndonville, N.Y., assignor to General Motors Corporation, Detroit, Mich.
Filed July 15, 1969, Ser. No. 841,783
Int. Cl. F16k *31/165*
U.S. Cl. 251—61 1 Claim

In preferred form, a vacuum-powered torque actuator hav-

ing a plastic pie-shaped bellows. The bellows contracts to pivot an attached member when its air-filled interior is



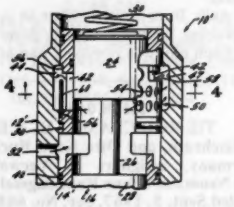
evacuated. Resultantly an air damper connected to the member is positioned in an air duct to regulate airflow.

3,588,037

EROSION SHIELD FOR A THROTTLING VALVE

Henry B. Ritchie, Mason, Ohio, assignor to General Electric Company

Filed Oct. 27, 1969, Ser. No. 869,729
Int. Cl. F16k *47/00*
U.S. Cl. 251—127 **5 Claims**



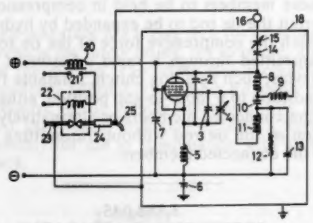
A shield is provided for preventing erosion of a lightweight housing surrounding a spool-type throttling valve. Movement of the conventional spool permitted high-pressure fuel to flow therepast and to impinge directly upon the wall of the housing, causing erosion thereof. A perforated cylindrical shield is placed within the housing with a solid-wall portion located directly opposite the fuel outlets, thus preventing direct impingement of fuel on the housing.

3,588,038

AUTOMATIC COCK DEVICE

Tameo Tanaka, Aira-gun, Japan, assignor to Kyokuto Giken Co., Ltd., Kagoshina-Ken, Japan

Filed Oct. 24, 1968, Ser. No. 770,311
Claims priority, application Japan, Oct. 25, 1967, 42/68321
Int. Cl. F16k *31/02*; H01h *47/00*
U.S. Cl. 251—129 **7 Claims**



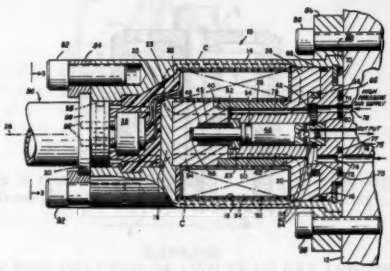
An automatic cock device comprises a tank circuit capable of oscillation at a frequency of around 40 Mc/S for operation of a cock for a water basin. An electrically conductive member is positioned adjacent the water basin and is electrically insulated from ground and electrically coupled with the tank circuit. The member is adapted to be influenced by the proximity of a hand of a human body thereto to cause a high frequency loss in the circuit including the member and the hand, thereby causing a variation in the oscillating condition of the tank circuit to operate a solenoid valve which controls the flow of water through the cock.

3,588,039

SOLENOID VALVE STRUCTURES AND SYSTEMS

Stephen V. Chelminski, West Redding, and Anthony J. Delano, Westport, Conn., assignors to Bolt Associates, Inc., Norwalk, Conn.

Filed Sept. 5, 1969, Ser. No. 855,667
Int. Cl. F16k *31/06*
U.S. Cl. 251—141 **28 Claims**



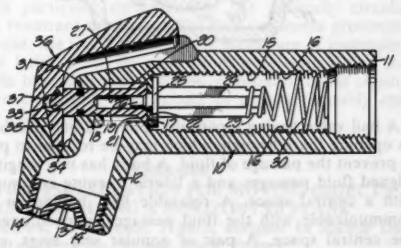
High performance, reliable solenoid valve structures and systems are described suitable for industrial uses and for use in a corrosive environment to control the flow of high pressure air from an inlet port to an outlet port. These solenoid valve structures are capable of withstanding high vibrational forces and certain embodiments of being submerged in salt water, having an all stainless steel magnetic circuit. The solenoid valve structures include a plunger which together with a valve stem defines the valve, the plunger being selectively shaped to establish excellent pressure balance, for high performance reliability of the magnetic circuit, while the plunger and associated operating parts can be quickly and conveniently disassembled and reassembled without injury to the solenoid valve, to remove dirt particles if any should inadvertently enter through the air line. The solenoid coil and connections may be totally encased. A high strength electrical cable and watertight connection system may be employed with the valve structures adapted to be submerged.

3,588,040

SPRAY VALVE

Irving A. Ward, Los Angeles, Calif., assignor to Modern Faucet Mfg. Co., Los Angeles, Calif.

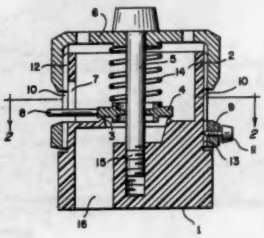
Filed July 17, 1968, Ser. No. 745,450
Int. Cl. F16k *31/60*
U.S. Cl. 251—244 **5 Claims**



A spray valve is disclosed which is of relatively simple and inexpensive construction. Such valves are used, for example, in conjunction with the water supply at a kitchen sink. The spray valve includes a body having a valve plug mounted

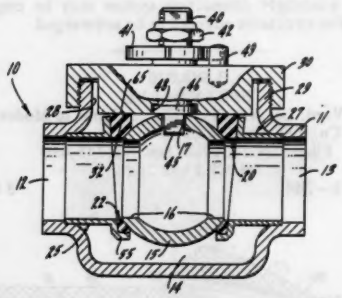
therein which seats with a portion of the body to control water flow through the spray valve. A trigger member is coupled with the valve plug for operation of the same, the valve plug being spring biased to normally maintain the valve closed.

3,588,041
EXHALATION VALVE
Dag Olof Alfred Johannisson, Lidingo, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden
Filed Oct. 29, 1968, Ser. No. 771,395
Claims priority, application Sweden, Nov. 2, 1967, 15010
Int. Cl. F16k *31/528, 15/18*
U.S. Cl. 251—263 **13 Claims**



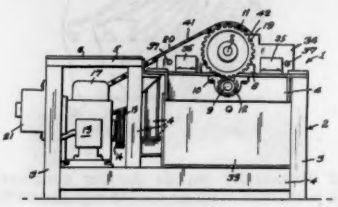
An exhalation valve for a breathing apparatus having a valve member urged against a valve seat by an adjustable retaining force. A mechanism is provided to adjust the relative position between the valve member and the valve seat independently of the retaining force.

3,588,042
TOP ENTRY BALL VALVE
John L. Yopp, Homewood, Ill., assignor to Union Tank Car Company
Filed Jan. 19, 1970, Ser. No. 3,652
Int. Cl. F16k *5/06*
U.S. Cl. 251—315 **7 Claims**



A ball valve having a partially spherical ball provided with an opening therethrough, which may be rotated to permit or to prevent the passage of fluid. A body has two longitudinally aligned fluid passages and a lateral opening communicating with a central space. A rotatable ball, having an opening communicable with the fluid passages, is positioned within the central space. A pair of annular seat rings, of wedge shape cross section, fit against and clampingly secure the ball therebetween. A pair of seat ring retainers, having sidewalls inclined downwardly and inwardly, wedge the ball and seat rings therebetween. Bonnet means selectively applies pressure to the seat rings and thereby compresses the seat rings to the ball and the retainer sidewalls.

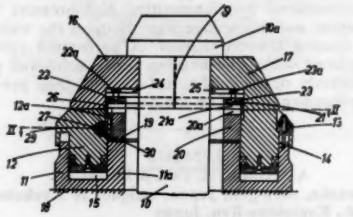
3,588,043
NAIL PULLING MACHINE
Earl N. Griswold, Savanna, Ill., assignor to The United States of America as represented by the Secretary of Army
Filed Apr. 14, 1969, Ser. No. 815,561
Int. Cl. B25c *11/00*
U.S. Cl. 254—18 **4 Claims**



A nail pulling machine for automatically pulling nails from used lumber consisting of a driven shaft mounted on a bench. The shaft carries two longitudinal rows of notched claw plates which, when rotated, engage over the nailheads and pulls them from the lumber. An idler shaft rotated by the driven shaft and carrying sweeper blades brushes the nails from the claw plates where they fall into a chute for storage and later disposal.

Removal of nails from used lumber in a time consuming and laborous process. This was usually done by hand, using a claw hammer. Each nail was removed one at a time.

3,588,044
TIE ROD CLAMP DEVICE
Ernst Georg Reichrath, and Otto Kark Buchheit, St. Ingbert (Saar), Germany, assignors to Verwaltungsgesellschaft Moeller und Neumann offene Handelsgesellschaft
Filed Sept. 5, 1967, Ser. No. 668,284
Claims priority, application Germany, Sept. 14, 1966, V31932
Int. Cl. E21b *19/00*
U.S. Cl. 254—29 **5 Claims**

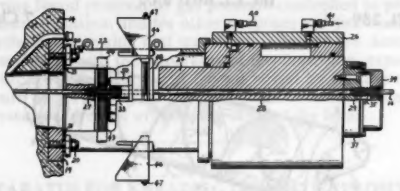


A tie rod clamping device suitable for example for rolling mill stands incorporates a hydraulic stressing device operatively connected between one end of the tie rod and one of two or more members to be held in compression by the tie rod to permit the tie rod to be expanded by hydraulic action, and in which the compressive force of the tie rod is adapted to be transmitted through a rapid adjustment thrust-transmitting device, such as a dog clutch, rotatable from a tooth-to-tooth position to a tooth-to-gap position, either to transmit force to the connected members or alternatively to allow for contraction of the tie rod without transmitting compressive forces to the connected members.

3,588,045
PRESTRESSING APPARATUS
Allan H. Stubbs, 19113 S. Hamilton St., Gardena, Calif.
Filed Jan. 31, 1969, Ser. No. 795,661
Int. Cl. E21b *19/00*
U.S. Cl. 254—29A **5 Claims**

An apparatus for tensioning cables which is particularly suitable for post-tensioning cables in concrete structural

members is disclosed. The apparatus utilizes a hydraulic drive means for applying forces to the cable. A pair of split wedges are utilized to securely grip the cable when force is



being applied to the cable and also when the piston in the drive means is on its return stroke. The stroke of the piston is relatively short thus allowing the entire apparatus to be contained within a small housing.

3,588,046

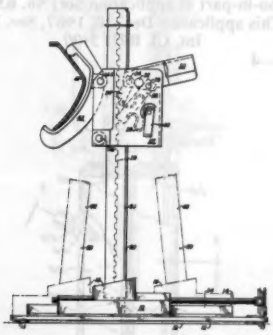
VEHICLE JACK AND ASSEMBLY THEREFOR

Rufus J. Weaver, 13 East St., and Anthony J. Gaetano, New London, Conn. (98 Park Ave., Uncasville, Conn. 06382)

Filed Oct. 21, 1968, Ser. No. 769,184

Int. Cl. B66f *3/08, 1/04*

U.S. Cl. 254—85 **7 Claims**



The disclosed invention is a lifting jack for attachment to a bumper of a vehicle for safely lifting, for example, a wheel of the vehicle off the ground. The lifting jack includes a vertically and horizontally adjustable assembly for safely positioning the jack relative to the vehicle bumper during lifting. In an embodiment, the present invention includes a horizontally adjustable assembly for use in combination with an automobile bumper jack.

3,588,047

LIFTING, SUPPORTING AND MOVING DEVICE

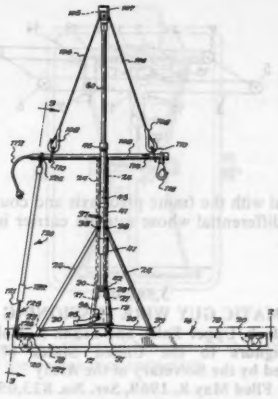
John B. Gormley, 60 McClellan Circle, Buffalo, N.Y.

Filed Feb. 26, 1968, Ser. No. 708,387

Int. Cl. B66f *3/24*

U.S. Cl. 254—93 **5 Claims**

This device is an improvement or addition to the device of my U.S. Pat. No. 3,355,147 of Nov. 28, 1967, by including a carriage on which my device may be supported for more readily moving the same from one location to another and on



which it is removably mounted for lifting and moving the device from place to place independently of the carriage.

3,588,048

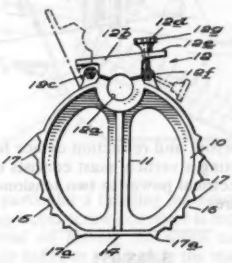
JACK FOR TRACTOR DRAWN TRAILERS AND THE LIKE

George E. McCorrison, Augusta, Maine, assignor to MC-Y & M Co. Inc., Gardiner, Maine

Filed Oct. 16, 1968, Ser. No. 768,120

Int. Cl. B66f *7/22*

U.S. Cl. 254—94 **8 Claims**



A rocker-type jack for trailers having an overall thickness of not over about 4 inches has a generally circular perimeter with an effectively diametrical strut means and a readily releasable axle embracing throat or collar at its perimeter at one end of the strut means and a flattened supporting base diametrically opposite said throat, with the arcuate perimeter at each side of said base provided with traction enhancing means. In particular embodiments: the generally circular body has reentrant portions in the two quadrants proximate to the throat; the traction enhancing means are of protruding form; the latter comprise protrusions extending below the level of the base; and special forms of throat or collar closing means are employed. The throats or collars rotatably embrace the axles when closed thereon.

3,588,049

TRACTION INSTALLATION FOR MOVING OBJECTS RUNNING ALONG A HORIZONTAL PLANE

Andre Nectoux, Le Creusot, France, assignor to Societe Des Forges et Ateliers Du Creusot, Paris, France

Filed Apr. 11, 1969, Ser. No. 815,479

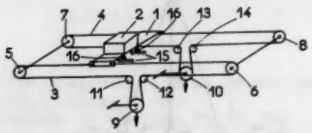
Claims priority, application France, May 6, 1968, 150,648

Int. Cl. E21c *29/16*

U.S. Cl. 254—147 **3 Claims**

A traction installation, for example for an ingot truck, in which a pair of traction ropes each passes over a Koepe drive

pulley on a frame pivotal about an axis parallel to the pulley axis. Each frame carries reduction gear and a drive gear, the



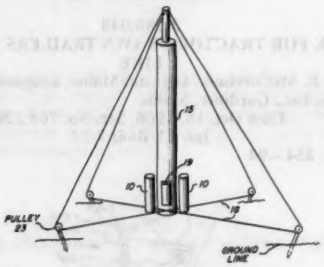
latter coaxial with the frame pivot axis and coupled to planet wheel of a differential whose satellite carrier is coupled to a drive motor.

3,588,050

AUTOMATIC GUY WIRE TENSIONING DEVICE

Walter L. Black, Upper Falls, and Frank L. Holford, Towson, Md., assignors to the United States of America as represented by the Secretary of the Army

Filed May 8, 1969, Ser. No. 823,055
Int. Cl. B66d 1/48
U.S. Cl. 254—173 **1 Claim**



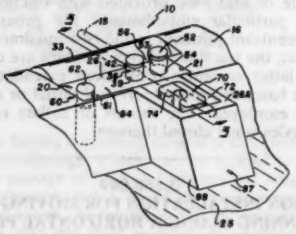
An automatic payout and retraction device for a set of guy wires used in erecting a vertical mast consists of a controller which supplies electrical power to two tensioner units which control the guy wires.

3,588,051

TOWING CABLE CONTROL APPARATUS

Howard M. Leeming, 5075 Cliff Drive, R.R. #2, Ladner, British Columbia, Canada

Filed May 19, 1969, Ser. No. 825,791
Int. Cl. B66d 1/36
U.S. Cl. 254—190 **5 Claims**



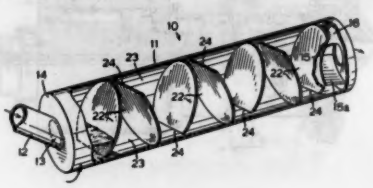
An apparatus having cable guiding members which can be retracted to an inoperative position or extended to an operative position with both movements being actuated by an operator stationed a safe distance from the guided portion of the cable.

3,588,052

CONTINUOUS BLENDER

Myndert T. Scholtz, Scarborough, Ontario, Canada, assignor to Toronto Coppersmithing Company Limited, Scarborough, Ontario, Canada

Filed Oct. 25, 1968, Ser. No. 770,622
Claims priority, application Canada, Nov. 16, 1967, 005,224
Int. Cl. B01f 9/02
U.S. Cl. 259—3 **7 Claims**



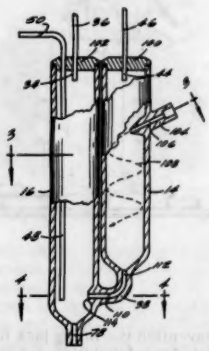
A continuous blender for mixing material such as powder, granular material, etc., employing a generally horizontal cylindrical housing with an inlet at one end and an outlet at the opposite end. A series of spaced-apart baffles are positioned in the housing to form a series of wedge-shaped compartments, each baffle being cut to permit adjacent compartments to communicate with one another. As the housing is rotated, material is caused to pass from one compartment to another towards the outlet, and during its passage through the housing the material is continuously tumbled within each compartment.

3,588,053

LIQUID MIXING AND TRANSFER APPARATUS AND METHOD

William Fletcher Rothermel, Hialeah, Fla., assignor to Coulter Electronics, Inc., Hialeah, Fla.

Continuation-in-part of application Ser. No. 631,284, Apr. 17, 1967. This application Dec. 20, 1967, Ser. No. 692,091
Int. Cl. B01f 5/00
U.S. Cl. 259—4 **35 Claims**



Apparatus comprising at least one vessel into which liquids are introduced, mixed and drained without the use of any mechanical mixing device, without contamination and without agitation to an extent that slow-rising or persistent bubbles will not form. Such apparatus is adapted for connection into a system for the continuous automatic processing of samples. The apparatus comprise a single or plurality of vessels performing the functions mentioned and have a fitting at least in one vessel arranged to introduce the liquids tangential to the inner wall of the receiving vessel to produce a helical downward swirling of the liquid to impart rotary motion thereto. At the same time, at least in single vessels, an up-and-down movement of the liquid is produced by the in-

troduction of a gas into the drain and generates fast-rising bubbles passing through the liquid thoroughly to mix the same in the vessel. Alternate means for use in multiple vessel apparatus provide for interchange or transfer of liquids at the bottom of the vessels to effect the up-and-down mixing as well as rotation of the liquid. Structure for retaining liquid in the vessels by the use of gas introduced through a drain; for effecting liquid removal by gas pressure controlled to provide minimum agitation; and for other purposes are disclosed.

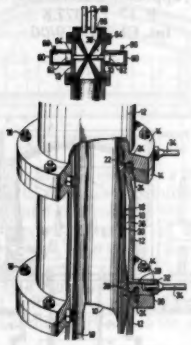
Methods for mixing and transferring liquids are described in connection with the apparatus of the invention, especially a method of expelling liquid from a vessel by the use of gas pressure above the surface of the liquid in which the amount of pressure decreases with the lowering of the level.

3,588,054

APPARATUS FOR KNEADING DOUGHY EXPLOSIVES

Sten Herman Ljungberg, and Bror Lennart Teodor Sternhoff, Vinterviken, Stockholm, Sweden, assignors to Nitro Nobel AB, Gyttorp, Sweden

Filed Dec. 17, 1968, Ser. No. 784,340
Claims priority, application Sweden, Dec. 27, 1967, 17877
Int. Cl. B01f *15/02*
U.S. Cl. 259—4 **10 Claims**



Apparatus including an elongated flexible hose located within a casing which is divided into a plurality of chambers and into which fluid under pressure is sequentially introduced to knead doughy material and cause a peristaltic advance of such material through the hose.

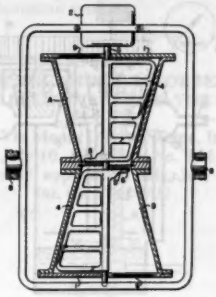
3,588,055

HOMOGENIZING DEVICE FOR POWDERED SOLIDS WHICH ARE NOT FREE FLOWING

Elkan J. De Jong, Rotterdam, Netherlands, assignor to Organon, Inc., Orange, N.J.

Filed July 2, 1968, Ser. No. 742,072
Claims priority, application Netherlands, July 7, 1967, 67.09461
Int. Cl. B01f *7/18*
U.S. Cl. 259—64 **6 Claims**

An hourglass-shaped assembly consists of two conical mixing compartments separated by a screen. A driven shaft extends axially through the assembly and in each compartment carries an agitator and a brush, the brushes in the two compartments engaging the opposite sides of the screen. In one embodiment the assembly is tiltable through 180° about a transverse axis. In another embodiment two or more assemblies are connected together in series and separated by



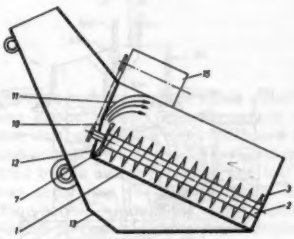
screens engaged by additional brushes. In the latter embodiment tilting of the device is unnecessary.

3,588,056

MIXER FOR CEMENT OR THE LIKE

Paul August, Capellades 1, Barcelona, Spain

Filed Mar. 8, 1968, Ser. No. 711,642
Int. Cl. B28c *5/10*
U.S. Cl. 259—178 **14 Claims**



A mixer in particular a building material mixer in which a rapidly rotating worm screw conveyor is mounted in a trough and the material on leaving the screw conveyor is driven against a wall or baffle to recirculate the material through the worm screw conveyor.

3,588,057

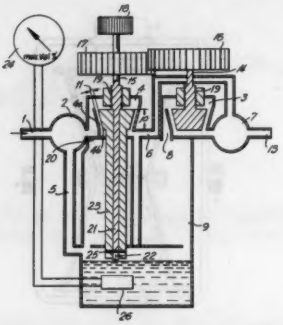
NARCOSIS APPARATUS

Hans George Breiling, Lubeck, Germany, assignor to Dragerwerk, Heinr. & Bernh. Drager, Lubeck, Germany

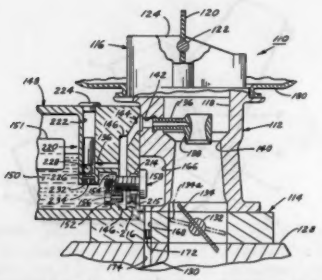
Filed Oct. 16, 1968, Ser. No. 768,107
Claims priority, application Germany, Oct. 21, 1967, P 15 66 596.0
Int. Cl. A61m *17/00*
U.S. Cl. 261—39 **7 Claims**

An apparatus for the vaporization of an anesthetic has been provided which apparatus achieves improved control in respect to the amount of anesthetic administered to a patient. The apparatus comprises a distribution chamber for a gas, a first conduit from the distribution chamber into a chamber in which the anesthetic is vaporized, a temperature sensing means in said vaporization chamber, a second bypass conduit from the distribution chamber having a throttle means interposed therein, said second conduit leading to a mixing chamber, an outlet conduit leading from the vaporization chamber to the mixing chamber and having a valve means interposed therein, said throttle means in said bypass conduit having an annular slot defined by a movable element on a throttle stem extension, said stem extension protruding into the vaporization chamber and having a sleeve surrounding the same, means for fastening said sleeve and said stem ex-

tension, said sleeve being of a material having a higher thermal coefficient of expansion than the material of which the stem extension is made, and said throttle and valve means having means provided to engage each other.



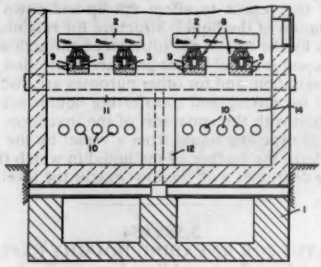
3,588,058
POWER VALVE ARRANGEMENT
Alvin S. Lucas, 33700 Edmonton, Farmington, Mich.
Filed Dec. 23, 1968, Ser. No. 786,320
Int. Cl. F02m 7/12
U.S. Cl. 261—67 **3 Claims**



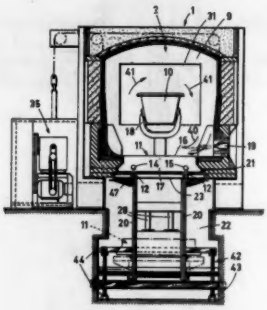
A carburetor having a fuel bowl or reservoir with a main fuel-metering system, including a metering restriction therefor, is provided with a second passage means in parallel with the metering restriction; the second passage means is normally maintained closed by a weighted valve member responsive to the vacuum generated at the venturi of the carburetor induction passage, when a venturi vacuum of sufficient magnitude is realized the second passage means is at least partially opened permitting additional quantities of fuel to flow to the main discharge nozzle thereby enriching the fuel-air ratio of the combustible mixture flowing into the engine intake manifold.

3,588,059
GUIDE RAIL ASSEMBLY FOR PUSHER-TYPE FURNACE
Hans Weineck, Oberhausen, and Edgar Laturell, Oberh.-Sterkrade, Germany, assignors to Huttenwerk Oberhausen AG, Oberhausen, Rhineland, Germany
Filed Aug. 5, 1968, Ser. No. 750,215
Claims priority, application Germany, Aug. 3, 1967, P 15 83 363.3; P 15 83 344.4
Int. Cl. F27d 3/02
U.S. Cl. 263—6 **12 Claims**

To support a succession of workpieces on a cooled guide rail of a pusher-type furnace, carrier blocks with hollow profiles and downwardly diverging side flanges are interposed between the workpieces and the rail, the flanges bracketing the upper part of the rail with lateral clearance to act as heat shields therefor. Thermally insulating spacers occupy part of the hollow cross sections of the blocks, the latter being supported on the rail either through the intermediary of these spacers or through lateral rail extensions on which the flanges rest.



3,588,060
ENAMELLING TUNNEL-TYPE FURNACE
Fernand Victor Francois Hermans, St. Josse Ten Noode, Belgium, assignor to Le Four Industriel Belge, Uccle, Belgium
Filed Apr. 22, 1969, Ser. No. 818,302
Claims priority, application Germany, May 14, 1968, P 17 71 377.8
Int. Cl. F27b 9/00
U.S. Cl. 263—28 **14 Claims**

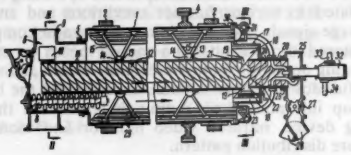


An enamelling tunnel type furnace comprising at least one support movable entirely inside the curing chamber of the furnace along the longitudinal axis of the furnace. The support carries the articles to be heated. The curing chamber is tightly closed and burners are fitted into at least one of the walls of the curing chamber, at a level positioned above the base of support, under the article. An opening is provided between the base and the article, so that heating the articles deposited on the support by convection is possible by means of the jets of waste gases originating from the burners and directed transversely to the longitudinal axis of the curing chamber.

3,588,061
APPARATUS FOR THERMAL TREATMENT OF FREE-FLOWING MATERIALS AND SLURRY
Nison Moshkovich Boguslavsky, Sadovaya-Chernogryazskaya, 11/2, kv. 37, Moscow, U.S.S.R.
Filed June 20, 1969, Ser. No. 834,966
Int. Cl. F27b 7/04
U.S. Cl. 263—32 **2 Claims**

An apparatus for thermally treating free-flowing slurry comprises a rotatably supported heated drum. Charging and a discharging devices are positioned respectively at the op-

posite ends of the drum. A recirculation tube is mounted in the drum and includes internal fins. A mixing device is provided at the outlet of the charging device and recirculation tube. A distributing device is arranged at the inlet of the



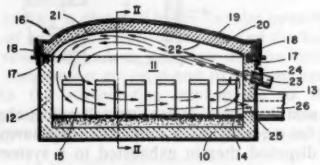
discharging device and includes a plurality of scoops fixed to the drum, and which scoops include discharge troughs directed into the recirculation tube and into the discharging device.

3,588,062

TOP-FIRED INGOT SOAKING PIT AND COVER THEREFOR

Harold L. Lloyd, Box 72, Winona, Ohio

Filed May 1, 1969, Ser. No. 821,022
Int. Cl. F27b *3/02*
U.S. Cl. 263—40 **10 Claims**



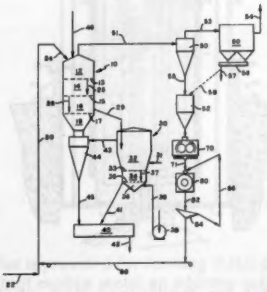
A cover and burner arrangement for a top-fired ingot soaking pit which effects improved circulation of the heated gases, especially around the butts of the ingots. The burner directs the flame toward a portion of the pit cover at an oblique angle. The cover diverts the flame and heated gases downwardly along the remote end wall of the pit without dissipating the velocity of the gases. The remote end wall may also be provided with a sloping portion to direct the downcoming gases across the floor of the pit.

3,588,063

PROCESS FOR COMPACTING DECREPITATABLE FINES

Peter A. Angevine, South Salem, N.Y., and Robert J. Priestley, Westport, Conn., assignors to Dorr-Oliver, Incorporated, Stamford, Conn.

Filed May 5, 1969, Ser. No. 821,725
Int. Cl. C04b *1/02*
U.S. Cl. 263—53 **13 Claims**



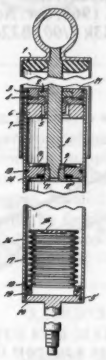
Recovery and compacting process for treating fines resulting from the decrepitation of feed solids to produce a granular substantially dust-free product which resists decrepitation upon being subjected to heat treatment. The process finds particular application in compacting decrepitated limestone fines coming from the preheat compartment of a fluidized bed limestone calcination system.

3,588,064

HYDROPNEUMATIC SHOCK ABSORBER PROVIDED WITH ELASTIC BELLOWS SEPARATOR OF WORKING FLUIDS

Piero Montanari, Via Monte Oliveto, Rome, Italy

Filed July 10, 1968, Ser. No. 754,518
Claims priority, application Italy, July 11, 1967,
Int. Cl. F16f *9/02*
U.S. Cl. 267—64 **4 Claims**



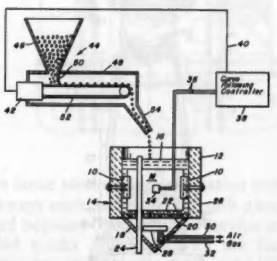
A telescopic-type hydropneumatic shock absorber having a gas containing elastic bellows member which comprises a cylinder piston unit, a movable piston disposed therein having both round compression and extension leaf springs, holes therein covered by the elastic action of said leaf springs and elastic bellows separating two fluids therein used for the shock-absorbing action, wherein the elastic bellows member has distributed on its cone rings the stress originated by the piston stroke in the cylinder.

3,588,065

APPARATUS FOR CONTROLLED COOLING OF METAL SAMPLES

Jerome Feinman, 1335 Woodland Drive, Monroeville, Pa.

Filed Aug. 25, 1967, Ser. No. 663,349
Int. Cl. C21c *1/44*
U.S. Cl. 266—5 **1 Claim**



This patent discloses a method and apparatus for controlled cooling of metal samples, e.g., specimens representing interior portions of steel plates having a thickness of about 2 to 10 inches. The practices used prior to the instant invention for simulating the cooling of such parts of such steel plates from an austenitizing temperature in the heat treatment thereof are quite cumbersome and laborious, involving several transfers of the specimen from one furnace or medi-

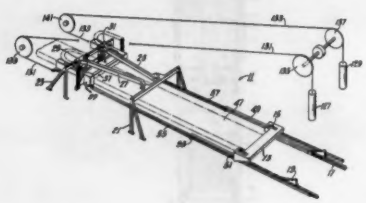
um to another, and at that, the simulation obtained is rather inexact and unreliable. This patent discloses that a better simulation is obtained, with far less labor and the use of far less equipment, by conducting the cooling of the sample in a fluidized bed of silica sand or the like, using gaseous products of combustion or other suitable gas as the fluidizing medium. Slow rates of cooling may be simulated by controlling the temperature of the fluidizing gas and/or the temperature of the furnace surrounding the fluidized bed. Faster rates of cooling are simulated by adding solids to the bed at a controlled rate.

3,588,066

APPARATUS FOR CUTTING A CONTINUOUSLY CAST METAL STRAND

Kurt Reinfeld, and Emmanuel V. Gouye, Pittsburgh, Pa., assignors to Koppers Company, Inc.

Filed Apr. 3, 1969, Ser. No. 812,979
Int. Cl. B23k 7/00; B22d 11/12
U.S. Cl. 266—23 **15 Claims**



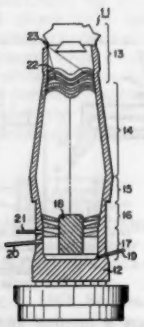
The invention comprises a support that moves along with a continuous cast strand and that supports two flame cutting torches. The torches move transversely to the cast strand along paths prescribed by established guide rods, and after a slab is severed from the cast strand the apparatus returns to its initial position. The apparatus is adapted to crop the head end from strands as well.

3,588,067

CONTROL APPARATUS FOR BLAST FURNACE OPERATION

Teruo Shimotsuma; Toshihiro Mori; Kazuo Sano, Yokohama-shi, and Tsuneo Miyashita, Kawasaki-shi, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 5, 1969, Ser. No. 847,631
Claims priority, application Japan, Aug. 8, 1968, 43/55989
Int. Cl. C21b 5/00
U.S. Cl. 266—25 **4 Claims**



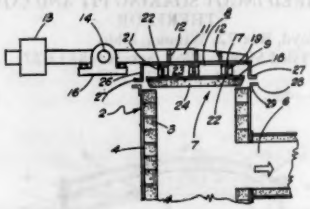
A control apparatus for blast furnace operation comprising an infrared video monitor for receiving output image signals obtained by picking up the image of a pattern of heat rays radiated from the top portion of a blast furnace charge using an infrared vidicon camera and detecting the condition of a stock line and gas streams at the furnace top, a monitor of temperature distribution pattern for receiving output image signals from the vidicon camera and indicating a pattern of temperature distribution at the furnace top in the corresponding hues, a data processing device for being previously stored with information on optimum operating requirements related to various furnace conditions and analyzing output image signals from the vidicon camera in comparison with the stored information and a control means for continuously bringing operating factors prevailing within and without the blast furnace to a most suitable condition on the basis of summed up information on output at least from the data processing device, infrared video monitor and monitor of temperature distribution pattern.

3,588,068

CUPOLA EXHAUST APPARATUS

Robert G. Huntington, Louisville, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.

Filed Feb. 24, 1969, Ser. No. 801,666
Int. Cl. C21b 7/08
U.S. Cl. 266—31 **3 Claims**



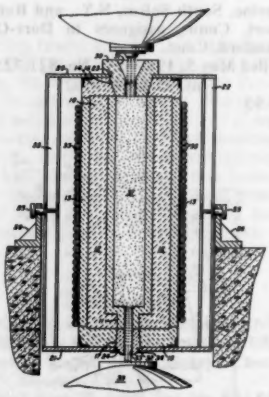
An exhaust arrangement for a metallurgical cupola including a cap for a cupola stack outlet, the cap having a plenum chamber disposed therein exhausted to a system below atmosphere pressure, the plenum chamber being in communication with the peripheral seal between the cap and stack outlet to facilitate removal of any stack gas leakage, the cap being floatingly mounted to permit more effective sealing with the stack outlet.

3,588,069

APPARATUS FOR DESULFURIZING FERROUS METAL

Richard E. Lyman, Homewood, Ill., assignor to United States Steel Corporation

Filed Oct. 24, 1968, Ser. No. 770,266
Int. Cl. C21c 7/04
U.S. Cl. 266—34 **3 Claims**



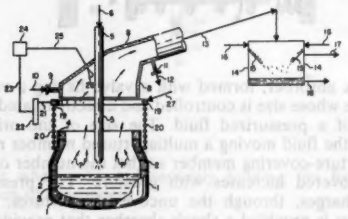
An apparatus for desulfurizing steel which provides a ceramic vessel containing a solid or liquid desulfurizing reagent and having an inductor coil therearound to preheat the vessel and the reagent therein. The vessel is adapted so that

the molten steel is poured therethrough and is desulfurized as it percolated down through the reagent. The desulfurized steel is drained from the bottom of the vessel.

3,588,070
OXYGEN STEEL CONVERTER

Harry L. Richardson, New York, and George E. Cranston, Baldwin, N.Y., assignors to Chemical Construction Corporation, New York, N.Y.

Filed June 19, 1969, Ser. No. 834,762
Int. Cl. C21c *5/32*
U.S. Cl. 266—34 **7 Claims**

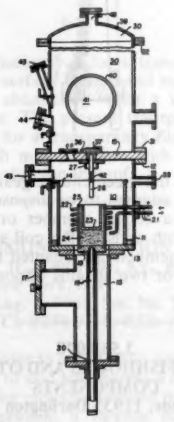


A chain curtain is disposed in the annular opening between the mouth of an oxygen steel converter and the lower end of an off-gas removal hood, to modulate air flow into the hood to control combustion air ratio and to prevent egress of the off-gas into the surrounding atmosphere as the off-gas debouches from the oxygen steel converter to the hood during the oxygen blow period of the furnace-operating cycle.

3,588,071
APPARATUS FOR POWDERING METALS

Joseph M. Wentzell, Remsen, N.Y., assignor to Homogeneous Metals, Inc.

Division of Ser. No. 691,052, Dec. 15, 1967, Pat. No. 3,510,546
Filed Oct. 14, 1969, Ser. No. 866,323
Int. Cl. C21c *7/00*
U.S. Cl. 266—34R **5 Claims**

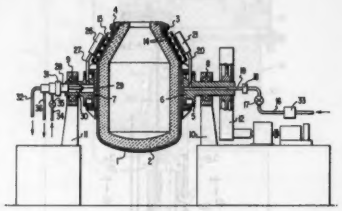


An apparatus is provided for forming metal powders by adding to a bath of molten metal an additive material having a vapor pressure substantially higher than the metal, spraying the molten metal and additive into a reduced pressure chamber through an orifice, cooling the particles formed in the spray and collecting the cooled particles.

3,588,072
COOLING APPARATUS FOR A CONVERTER BODY

Ken Matsumoto, and Ichizo Hamabe, Kobe, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Sept. 16, 1968, Ser. No. 759,930
Claims priority, application Japan, Sept. 16, 1967, 42/59516
Int. Cl. C21c *5/46*
U.S. Cl. 266—36 **6 Claims**

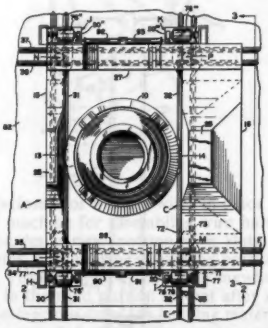


Cooling passages are formed in a fixed manner about the nose opening and upper conical portion of a converter and are connected to common supply and exhaust headers mounted on the shell of the converter. The headers are connected to rotary passages formed through the supporting trunnions of the converter by flexible connections whereby a coolant may be supplied to the cooling passages without interfering with the operation of the converter.

3,588,073
APPARATUS FOR MAKING STEEL

Ross B. McCready, Alliance, and Klaus W. Forster, Brecksville, Ohio, assignors to The Alliance Machine Company, Alliance, Ohio

Continuation-in-part of application Ser. No. 567,721, July 25, 1966, which is a continuation-in-part of application Ser. No. 514,321, Dec. 16, 1965, now Patent No. 3,312,544, dated Apr. 4, 1967. This application Dec. 22, 1967, Ser. No. 692,870
Int. Cl. F27d *3/12;* **C21c** *5/50*
U.S. Cl. 266—39 **3 Claims**



An oxygen lance steelmaking installation comprising intersecting trackways each having spaced rails along which a furnace is moved between operating and service areas, a plurality of wheeled trucks associated with the furnace and individually rotatable about vertical axes and lifting apparatus permanently installed at the rail intersections for lifting the trucks so that they can be rotated to change the direction of travel of the furnace.

ERRATUM

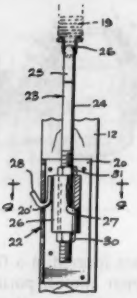
For Class 267—064 see:
Patent No. 3,588,064

3,588,074

DEVICE FOR SECURING AND ADJUSTING SPRINGS

John Ochs, 2923 Yearling St., Lakewood, Calif.

Filed June 9, 1969, Ser. No. 831,457
Int. Cl. F16f 1/12
U.S. Cl. 267—73 7 Claims



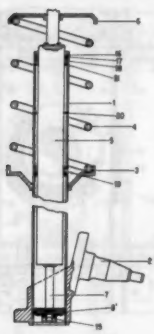
The application discloses a device for securing garage door springs in place including a threaded rod hooked at one end and having a slideable sleeve thereon provided with an oppositely facing hook together with nuts threaded on the rod beyond each end of the sleeve.

3,588,075

LOAD BEARING ASSEMBLY

Carl Ullrich Peddinghaus, Ob. Lichtenplatzer Str. 268, Wuppertal-Barmen, Germany

Filed Sept. 6, 1968, Ser. No. 758,929
Claims priority, application Germany, Sept. 9, 1967, P 16 25 418.5
Int. Cl. F16f 5/00
U.S. Cl. 267—121 13 Claims



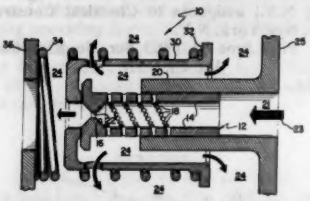
A load-bearing assembly having a tubular body provided with two axially spaced guide elements, and a shock absorber including a cylinder slidable in the guide elements and having a closed end which extends towards one end of the tubular body and a piston rod which extends from the other end through sealing means in the body, means for securing the extended portion of the piston rod relative to the body and resilient means for biasing the cylinder towards the first named end of the tubular body for sustaining the load to be borne.

3,588,076

VARIABLE-ORIFICE DEVICE

Robert L. Ammerman, La Mirada, Calif., assignor to North American Rockwell Corporation

Filed Dec. 20, 1968, Ser. No. 786,550
Int. Cl. F16f 5/00
U.S. Cl. 267—127 9 Claims



A shock absorber, formed with a valve having a variable size orifice whose size is controlled and directly related to the pressure of a pressurized fluid. The size of the orifice is varied by the fluid moving a multiapertured member relative to an aperture-covering member so that the number of apertures uncovered increases with pressure. The pressurized fluid discharges, through the uncovered apertures, into a sump. Thus is provided a shock absorber that provides very rapid motion at the initiation of a shock which motion diminishes at a more rapid rate than the rate that the shock diminishes.

3,588,077

SAFETY SPRING FOR THE SPEED CHANGE GEAR OF A BICYCLE

Nobuo Ozaki, 277, Naka 3-cho, Hamadera-Suwanomori-cho, Sakai, Osaka Prefecture, Japan

Filed Feb. 18, 1969, Ser. No. 800,152
Claims priority, application Japan, Jan. 14, 1969, 3517/1969
Int. Cl. F16s 1/46
U.S. Cl. 267—176 8 Claims

A safety spring for the speed change gear of a bicycle comprising a coil spring adapted to be disposed axially about a gearshift wire, and a socket member or socket members formed at one or both ends of the coil spring. The socket member or socket members are adapted to hold therein an end or ends of one or two sheaths disposed likewise about the gearshift wire.

3,588,078

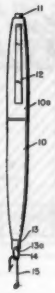
HOLDER FOR FISHHOOKS AND OTHER SMALL COMPONENTS

Nicholas Van De Sande, 11933 Darlington Ave., Los Angeles, Calif.

Filed Mar. 11, 1969, Ser. No. 806,206
Int. Cl. B25b 1/00, 3/00; A01k 97/06
U.S. Cl. 269—6 4 Claims

A holder for fishhooks or the like comprising a pen barrel shaped outer member adapted to be clipped to a shirt pocket and having an ejection-retraction mechanism selectively operable to move a loop-shaped wire member outwardly

against the restoring force of a spring so as to permit a fishhook or the like to be inserted in the loop, the loop-shaped member when retracted securely holding the fishhook or similar small component.

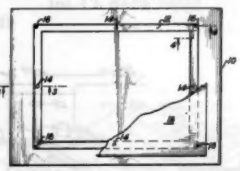


3,588,079

NEGATIVE MOUNTING PLATE

William D. Addy, Catonsville, and Forrest A. Wessells, Baltimore, Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Sept. 30, 1968, Ser. No. 763,522
Int. Cl. B25b *11/00*
U.S. Cl. 269—21 **1 Claim**



The invention disclosed is for a transparent plate having channeling on one surface thereof and means for maintaining a vacuum in the channeling when a transparency film is mounted thereover. The present transparent plate usefully serves as a mount for a transparency film without any additional means which may interfere with further developing, processing, or reproduction thereof.

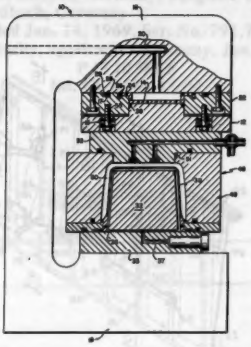
3,588,080

EXTRUSION PREVENTION MEANS

Claude R. Wallick, Jr., Louisville, Ky., assignor to American Standard, Inc., New York, N.Y.

Filed Aug. 2, 1968, Ser. No. 749,690
Int. Cl. B25b *1/18;* **B22c** *15/28*
U.S. Cl. 269—25 **10 Claims**

The invention relates to a hydraulic press, which has a pair of jaws at least one of said jaws having a movable platen, said movable platen being movably secured to said jaw by fastening means therebetween; a flexible membrane having a peripheral, extending rib and being fastened to said jaw by fastening means and positioned intermediate said movable platen and said jaw, and pressure means in communication with the flexible member. A groove is provided between said at least one jaw and said fastening member intermediate the end wall thereof and said flexible member, said groove having disposed therein first sealing means and second sealing means, said first sealing means adapted to prevent the extrusion of hydraulic fluid from said apparatus during pressing and said second sealing means adapted to prevent extrusion of said first sealing means from the apparatus during pressing.

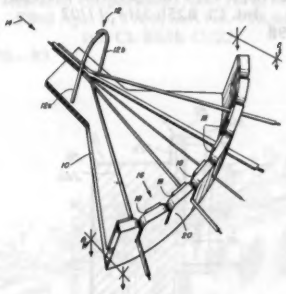


3,588,081

WIRE-HOLDING COMB

David Jopson Logan, Glastonbury; Ronald B. Webster, Melrose; Robert Joseph Pavone, Wapping, and David Gilmer Richardson, Jr., Stafford Springs, Conn., assignors to The Gerber Scientific Instrument Company, South Windsor, Conn.

Filed Oct. 9, 1969, Ser. No. 865,116
Int. Cl. B25b *5/14*
U.S. Cl. 269—40 **3 Claims**



A device is disclosed for holding wires in place as they are "layed-up" in a machine for assembling wire harnesses, and each device includes a rigid portion with slots for loosely receiving the wires, and a resilient backing portion also provided with slots. The backing portion has somewhat narrower slots than those in the rigid portion so that after insertion of the wires, tension tends to draw the backing material into the rigid portion to positively hold the wires in the comb.

3,588,082

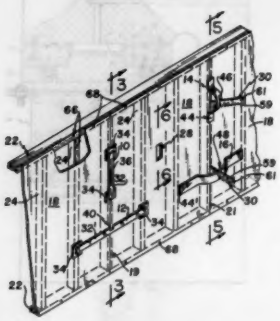
BRACING DEVICE FOR WALL CONSTRUCTIONS

Robert R. Chiffoleau, and Rocco Papalia, Antioch, Calif., assignors to Kaiser Gypsum Company, Inc., Oakland, Calif.

Filed Oct. 16, 1967, Ser. No. 675,395
Int. Cl. B23q *3/00;* **B05c** *11/14*
U.S. Cl. 269—49 **12 Claims**

A knockdown bracing device comprised of a resilient pressure applying member and an elongated clip for holding the pressure applying member in place. The bracing device can be used to clampingly engage various elements of a wall structure during the period that an adhesive is used to permanently secure these same wall elements together. The

pressure applying member is adapted to engage the exposed surfaces of a pair of adjoining wall panels being emplaced. The elongated clip can be disposed between and project through the adjacent and abutting side edges of the adjoining



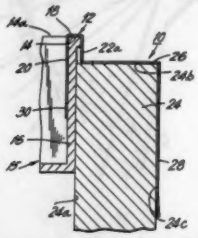
panels and can be provided at one portion thereof with means for releasably engaging a wall supporting element to which the wall panels are being adhesively secured and at another portion thereof with means for releasably and adjustably engaging the resilient pressure applying member.

3,588,083

JIG FOR MOUNTING ELECTRICAL OUTLET BOXES

Joseph R. Callanan, Whitman, Mass., assignor to Cal-Tav, Inc., Cambridge, Mass.

Filed Sept. 11, 1968, Ser. No. 759,032
Int. Cl. B25b *5/14, 11/02*
U.S. Cl. 269—98 **10 Claims**



A jig for mounting electrical outlet boxes to building wall members having a three-sided open loop section adapted to grasp a wall of an outlet box, an arm extending from the loop section to align the box and jig on a building wall member, and a leg member extending from the arm to hold the jig and box on the building wall member.

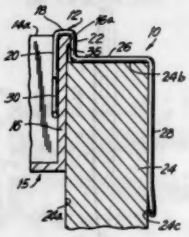
3,588,084

MOUNTING JIG FOR ELECTRICAL OUTLET BOXES

Joseph R. Callanan, Whitman, Mass., assignor to Cal-Tav, Inc., Cambridge, Mass.

Filed Nov. 1, 1968, Ser. No. 772,566
Int. Cl. B25b *5/14, 11/02*
U.S. Cl. 269—98 **9 Claims**

A jig for mounting electrical outlet boxes to building wall and ceiling members having a three-sided open loop section adapted to grasp a wall of an outlet box, an alignment arm section extending from the loop section to align the box and jig on a building member, and a leg member section extending from adjacent the arm section to hold the jig and box on a building member.

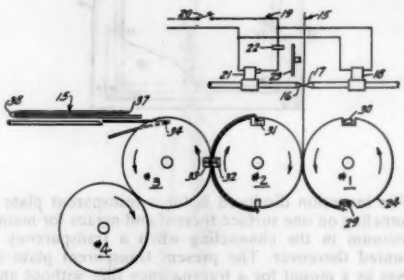


3,588,085

METHOD OF MAKING MAGAZINE INSERT

Robert Charles Bailey, Burnsville; Maurice William Eppard, Minneapolis; Harry Albert Estes, Edina; Jerry Allen Higgins, Minneapolis; Glen Stuart James, Excelsior; Henry Aldrich Montillion, St. Paul; Verne Vincent Myring, Minneapolis; Orville Herbert Robertson, West St. Paul; Blaine Walter Sargeant, and Neal Edwin Sorensen, Minneapolis, Minn., assignors to Holden Industries, Inc., Minneapolis, Minn.

Filed May 5, 1969, Ser. No. 823,248
Int. Cl. B41l *43/14*
U.S. Cl. 270—37 **20 Claims**



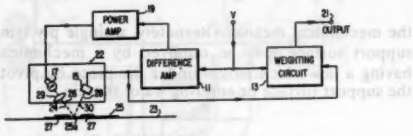
A magazine insert and method of making same, the insert consisting of a plurality of superimposed pages, each connected to the other by adhesive applied therebetween along a pair of spaced parallel lines extending along their binding edges and each being perforated along a line parallel to and extending between the lines of adhesive so that the portion remote from the binding edge may be torn free to provide a bound article readily removable without damages to the binding of the primary magazine. The insert is made by applying adhesive at different locations to opposite sides of a sheet in ribbon form along and at opposite sides of a pair of spaced longitudinally extending perforations, the ribbon being folded upon itself transversely with standard folding machine equipment a number of times, depending upon the number of pages desired in the end product and, as desired, cut or folded longitudinally to produce an insert particularly adapted for securement into the primary magazine by perfect binding or saddle-stitching, respectively.

3,588,086

INSERTION MACHINE HAVING FEEDBACK LIGHT CONTROL SYSTEM

Norton William Bell, Pasadena, Calif., assignor to The Bell and Howell Company, Chicago, Ill.

Division of Ser. No. 605,240, Dec. 28, 1966, Pat. No. 3,517,167.
Filed Mar. 18, 1970, Ser. No. 20,616
Int. Cl. B65h *39/02*
U.S. Cl. 270—58 5 Claims



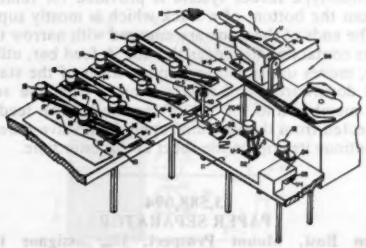
A reflective sensing type of document scanning apparatus in combination with an insertion machine wherein a lamp is powered by the output of a differential amplifier having a first input from a photodetector which detects reflected light from document, and a second input from a reference voltage is described.

3,588,087

METHODS AND APPARATUS FOR AUTOMATICALLY REGISTERING AND COMBINING FABRIC WORKPIECES

Herman Rovin, East Norwalk, and Fred J. Schiffmacher, New Canaan, Conn., assignors to Ivanhoe Research Corporation, New York, N.Y.

Division of Ser. No. 619,302, Feb. 28, 1967, Pat. No. 3,531,107.
Filed Apr. 14, 1969, Ser. No. 840,076
Int. Cl. B65h *39/02*
U.S. Cl. 270—58 13 Claims



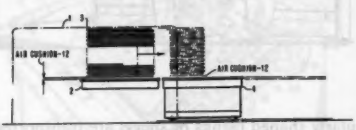
A method and apparatus for automatically registering fabric workpieces for use in a production line to bring an edge or edges of the workpieces into accurately known locations and then for combining the registered workpieces together in readiness for joining them. Force impulses are applied to the workpiece by pulsating air jets flowing beneath the workpiece, the pulses of air being generated by valving or fluttering vibrating reed elements or both for agitating the workpiece to reduce friction effects as the workpiece is impelled by the impulses edgewise toward stop surfaces to register it. In certain embodiments pulsating air jet units are mounted on a movable or invertible head which accomplishes the dual functions of registering a workpiece and then of moving or inverting the workpiece to combine it with another workpiece. The head holds the registered workpiece in position thereon by suction during motion. In modified embodiments a revolving suction member is mounted upon the movable head to provide the dual functions of registering and combining.

3,588,088

TRANSPORT DEVICE FOR A WEB MATERIAL FOLDING OR PROCESSING MACHINE

Franz Reiners, Post Berg/Erkelenz-Land, and Erich Kamphausen, Rheydt, Germany, assignors to A. Monforts, Monchengladbach, Germany

Filed Jan. 16, 1969, Ser. No. 791,720
Claims priority, application Germany, Jan. 25, 1968, P 17 10 581.6
Int. Cl. B65h *45/02*
U.S. Cl. 270—79 2 Claims



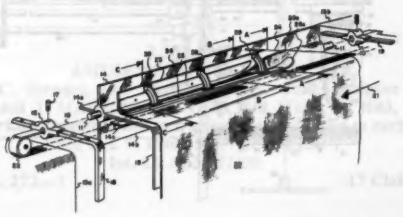
Transport device for a web material processing machine comprising a support having a substantially horizontal tabletop surface formed with an array of compressed-air nozzle openings and divided into a plurality of nozzle field zones extending in the longitudinal direction of a web of material being folded thereon, and means for supplying compressed air selectively to the nozzles of one of the field zones so as to form an air cushion underlying the folded web material located over the one field zone.

3,588,089

CONTINUOUS FLOW FOLDING DEVICE WITH STORAGE AND RETRIEVAL SYSTEM FOR PRODUCING VARIOUS SIZES OF FOLDS

Thomas L. Flanagan, Killingworth, Conn., assignor to Wagner Research Corporation, New York, N.Y.

Filed Apr. 3, 1968, Ser. No. 718,445
Int. Cl. B65h *45/22*
U.S. Cl. 270—93 4 Claims



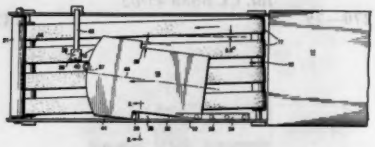
A passive, limp sheet material folding device which passively orients and/or urges the edge and adjacent portion of the sheet to a position whereby the sheet material folds itself in a natural flow bend peculiar to the particular sheet material as the sheet material actively passes through the device. The device is self-starting, and the edge and adjacent portion of the moving sheet is urged to advance arcuately toward the body of the material thereby folding over itself. The device includes an edge-orienting ramp along which the sheet material edge rises, a ply separator which restrains the body during the elevation of the edge and separates the folded plies, and a natural flow guide plate which follows the contour of the natural bend of the sheet material during the folding of the material. A plurality of sheet material folding devices for orienting sheet material to fold naturally to produce different size hems are premounted on plates or bases radially extending from a common axis and rotationally indexable as desired by the user into a workline providing a rotary indexable storage and retrieval system.

3,588,090

ALIGNING MECHANISM FOR ENVELOPE BLANKS

James Anthony Huston, Dayton; Robert Wayne Belden, and Kenneth Devere May, Sidney, Ohio, assignors to Bell & Howell Company, Sidney, Ohio

Filed Nov. 13, 1969, Ser. No. 876,394
Int. Cl. B65h *5/36*
U.S. Cl. 271—1 **24 Claims**



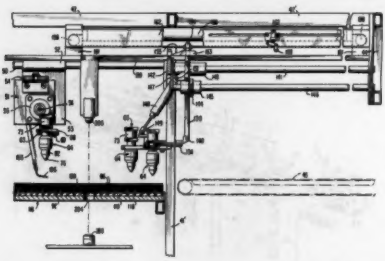
Irregularly shaped blanks or sheets are transported along a conveyor system having conveyor belts for biasing the blanks against a wall located along the conveying structure. The blanks are irregular (for example, T-shaped) and contact the wall at several points. An aligning pin is provided with a photocell operated means for selectively moving it into the path of the blank so that the pin makes sliding contact with the side edge of a trailing portion of each blank. In this regard, the aligning pin is moved into a position relative to the wall so that continued motion along the conveyor causes each blank to pivot into its desired alignment.

3,588,091

APPARATUS AND METHOD FOR PICKING UP AND TRANSPORTING CLOTH PIECES FROM A STACK

Eugene E. Stone, III; Walter L. Lynch, Jr., and Roger D. Barron, Greenville, S.C., assignors to Stone Manufacturing Company, Greenville, S.C.

Filed Nov. 8, 1968, Ser. No. 774,246
Int. Cl. B65h *3/22*
U.S. Cl. 271—19 **19 Claims**



An apparatus and method of picking up individually pieces of cloth from a stack thereof and carrying the individual cloth pieces away from the point of picking up and depositing them individually on a support such as a conveyor. The invention is characterized by its ability to pick up or separate individual cloth pieces from the stack without removing the next underlying piece or a plurality of such pieces. The cycle of operation is automatic and repetitive.

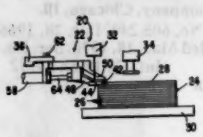
3,588,092

METHOD AND APPARATUS FOR REMOVING A SINGLE PLY OF FABRIC

Alexander Dubas, Passaic, N.Y., assignor to The Singer Company, New York, N.Y.

Filed June 2, 1969, Ser. No. 829,196
Int. Cl. B65h *3/32*
U.S. Cl. 271—19 **1 Claim**

This disclosure relates to a method and apparatus for removing a single ply of fabric by means of a mechanical gripper. If there is a pile of fabric plys, the top ply will be separated from the rest of the pile which remains in a clamped condition to permit its sole removal from the pile by



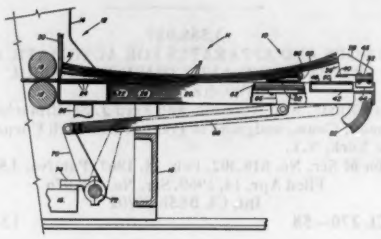
the mechanical means. Alternately, a single ply lying upon a support surface may be removed by a mechanical gripper having a jaw which passes under the piece by pivoting upon the support surface or entering a slot therein.

3,588,093

SUCTION FEEDER BAR FOR WARPED SHEETS

Henry D. Ward, Jr., Phoenix, and William F. Ward, Lutherville, Md., assignors to The Ward-Turner Machinery Company, Baltimore, Md.

Filed Oct. 25, 1968, Ser. No. 770,720
Int. Cl. B65h *3/08*
U.S. Cl. 271—32 **6 Claims**



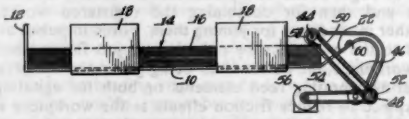
A suction-type feeder system is provided for removing a sheet from the bottom of a stack which is mostly supported in air. The ends of the stack are engaged with narrow tapered members contacting the edges thereof. A feed bar, utilizing a vacuum, moves under the lowermost sheet of the stack and sucks it downwardly and moves it away from the adjacent tapered member into the nip of feed rolls. The feed bar is disconnected from the vacuum supply by a valve timed so as to discontinue its grip on the sheet at this later time.

3,588,094

PAPER SEPARATOR

Jonathan Bost, Mount Prospect, Ill., assignor to OPTO/Graphics, Inc., Kenilworth, Ill.

Filed Nov. 8, 1968, Ser. No. 774,381
Int. Cl. B65h *1/04*
U.S. Cl. 271—36 **9 Claims**



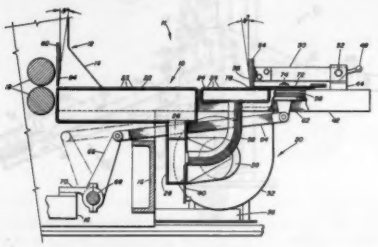
A paper separator for separating sheets of paper from a stack thereof. Rubber rollers advance the top sheet from the stack against a pair of protuberances of shallow height. The sheet of paper snaps over the protuberances. If two sheets are inadvertently moved edgewise from the stack, the top sheet snaps over the protuberances, but holds the lower sheet down against the protuberances which prevent advance of the second sheet.

3,588,095

SUCTION TABLE SYSTEM FOR FEEDING OF WARPED SHEETS

Henry D. Ward, Jr., Phoenix; William F. Ward, Hampstead, and John H. Bachmann, Jr., Fallston, Md., assignors to The Ward-Turner Machinery Company, Baltimore, Md.

Filed Aug. 29, 1968, Ser. No. 756,182
Int. Cl. B65h *1/06*
U.S. Cl. 271—44 15 Claims



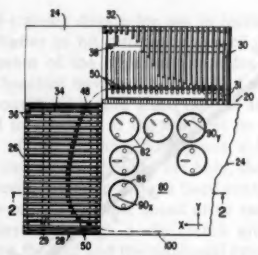
A suction type of feeder system is provided for handling and processing of sheets, some of which are warped, used in the manufacturing of boxes. The apparatus includes a perforated top vacuum box, which is positioned under a hopper containing sheets of corrugated paperboard to be fed through the system. Across the top of the vacuum box, there is provided a timed feeder plate which reciprocates to extend across the top of the box in contact therewith.

3,588,096

REGISTRATION DEVICE FOR FABRIC PIECES

Leigh D. Leiter, Pompton Plains, and Richard J. Redpath, Franklin Lakes, N.J., assignors to The Singer Company, New York, N.Y.

Filed May 26, 1969, Ser. No. 827,826
Int. Cl. B65h *9/04*
U.S. Cl. 271—58 2 Claims



This disclosure relates to a registration device for successively placing pieces of fabric in a predetermined position against retractible stops by means of pulsating jets of air blown in the direction of the stops so as to register the piece.

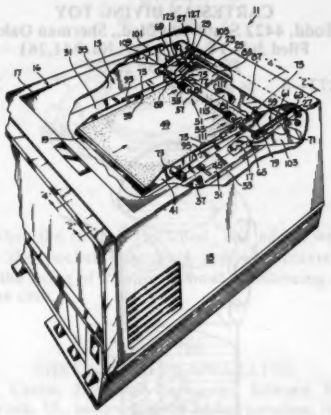
3,588,097

SHEET FEEDING APPARATUS

Edward W. Engel, Northbrook, Ill., assignor to SCM Corporation, New York, N.Y.

Filed Feb. 20, 1969, Ser. No. 800,933
Int. Cl. B65h *1/04*
U.S. Cl. 271—61 21 Claims

A photocopying machine has a storage compartment which is covered by a lid and contains a stack of copy paper sheets laterally confined between guide rails in a feeding position. Rotatably driven feed rollers advance the topmost sheet forwardly from the feeding position toward an exit throat, and the topmost sheet is separated from the remainder of the stack by corner separators engaging the forward corners of the stack. From the stack, the sheet moves through the exit throat which guides the incoming sheet into the nip of a pair of rotating rollers which remove the sheet from the compartment for further processing. To insert a fresh stack of sheets into the compartment, the feed rollers and the corner separators are supported for generally vertical movement and mechanically connected to the lid so as to move upwardly from the feeding position upon movement of the lid to uncover the compartment. The forward end of the stack is aligned with the corner separators by a pivotally supported stop member which is mechanically connected to the lid and pivotally moved into an upright position for engagement by the stack upon the uncovering movement of the lid. After the stack is properly inserted, the lid is moved to cover the compartment and moves the stop member from the upright position and moves the sheet advancing means and the corner separators onto the topmost sheet of the stack.



ERRATUM

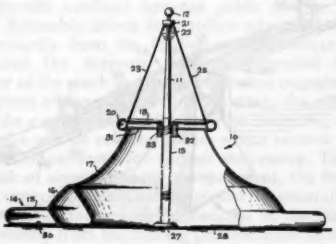
For Class 271—061 see:
Patent No. 3,588,106

3,588,098

AMUSEMENT APPARATUS

Mark C. Stewart, Los Angeles County, Calif., assignor to Wendell J. Mellor, Encino, Calif. and Mark W. Hild, II, West Los Angeles, Calif., a fractional part interest to each

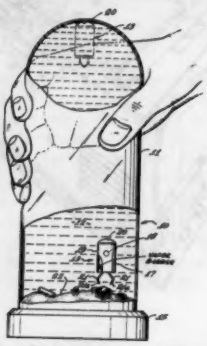
Filed Oct. 9, 1968, Ser. No. 766,230
Int. Cl. A63g *31/00*
U.S. Cl. 272—1 17 Claims



The amusement apparatus disclosed herein includes a central stanchion rotatably supporting a ball-screw block assembly having a flexible wall, cone-shaped, skirt member downwardly depending therefrom. Coupling means are employed to rotatably mount the skirt member on the block assembly so that as the block assembly rotates to move vertically, the flexible wall of the skirt member will alternatively

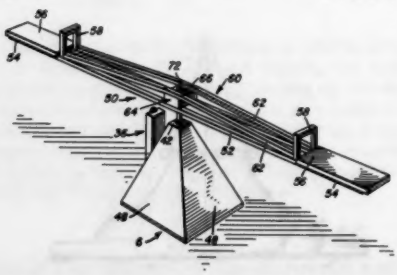
become taut and relaxed accordingly. A platform is fixed to the block assembly so as to rotate therewith while a plurality of extendable resilient elements interconnect the periphery of the platform with an anchor means adjustably carried near the top of the upright stanchion. The resilient elements are employed to normally bias the skirt member in its taut position via the platform and block assembly.

3,588,099
CARTESIAN DIVING TOY
John M. Todd, 4422 Sepulveda Blvd., Sherman Oaks, Calif.
Filed July 14, 1969, Ser. No. 841,261
Int. Cl. A63h *23/08*
U.S. Cl. 272—8 **20 Claims**



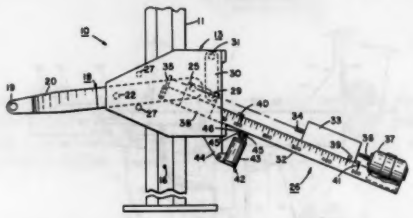
A diving toy having a flexible-walled container filled with water, and including a pressure-responsive diving assembly comprising an inverted, cup-shaped housing with a cup-shaped float therein, the housing having a pair of depending grappling claws pivoted thereon and linked to the float to be opened and closed in response to vertical movement of the float, which is surrounded by a clearance gap and guided by longitudinal ribs in one form, and has a chamfered lower end in another form. A layer of oil forms a vapor barrier around the float.

3,588,100
COMBINED ROUNDABOUT AND TEETER-TOTTER
Waldo W. Schoenwald, Box 544, and Virgil L. Farstad, Box 1842, Minot, N. Dak.
Filed Oct. 16, 1968, Ser. No. 768,071
Int. Cl. A63g *1/32, 11/00*
U.S. Cl. 272—30 **6 Claims**



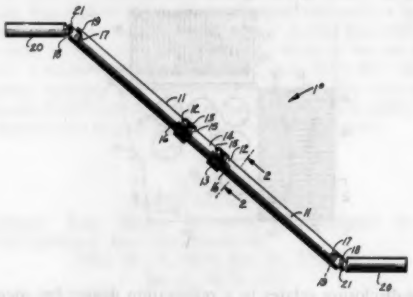
A truncated pyramidal housing encloses a motor-driven shaft. A boxlike case provides a turnable and tiltable head and is swivelly mounted atop the shaft by a ball and socket joint. A bottom beam has a median portion suspended from the head outward and ends equipped with seats. A top beam provides a stabilizing truss which is balanced so that the seats are self-levelling when not being used.

3,588,101
EXERCISING DEVICE WITH LOAD VARYING MECHANISM
Sidney W. Jungreis, 35 Park Ave., Blue Point, N.Y.
Filed Sept. 8, 1968, Ser. No. 760,409
Int. Cl. A63b *21/24, 21/20, 23/02*
U.S. Cl. 272—81 **17 Claims**



An exercise device including an exercising bar which is pivoted by the user to a predetermined point. The exercise bar is coupled to a scale beam having a movable weight thereon and a motor for moving the weight at various rates along the beam. After the exercise bar is pivoted by the user to a predetermined point, the motor is actuated so as to move the movable weight along the beam to continuously increase the load on the user's muscles. The muscles involved are thus first isometrically exercised and then react against a kinetic force with a limited isotonic range of motion.

3,588,102
EXERCISE BAR
Lawrence F. Gifford, 509 Pleasant St., Winthrop, Mass.
Filed Nov. 10, 1969, Ser. No. 875,090
Int. Cl. A63b *21/00*
U.S. Cl. 272—81 **4 Claims**



A hand-held device employing weights and a twisting and revolving method of motion. The weights are removably connected to the device by a pair of sleeves which join a weight member to the bar portions. Each bar portion has universal-type joints at the ends which are equipped with handle grips.

3,588,103
GOAL FOR A BASKETBALL GAME
Eugene M. Fuller, Aiken, S.C. (300 Pine Knoll Drive, Greenville, S.C. 29609)
Filed Aug. 9, 1968, Ser. No. 751,589
Int. Cl. A63b *63/04*
U.S. Cl. 273—1.5(R) **8 Claims**

A goal for a basketball game is suspended from a pair of support rods which are connected to diametrically opposite

points on the rim of the goal. The upper ends of the support rods are pivotally connected to an overhead support bar

which is rotatable about a vertical axis extending through the center of the rim.

3,588,104

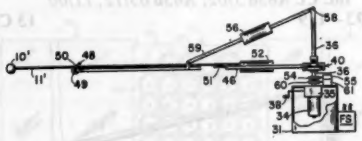
BASEBALL BATTING TRAINING DEVICE

Billy J. Griffin, 3961 Scott Drive, Forest Park, Ga.

Filed Nov. 14, 1968, Ser. No. 775,752

Int. Cl. A63b *69/40*

U.S. Cl. 273—26 **2 Claims**



A baseball-training device for use in increasing the proficiency of a batter to hit different types of pitched balls. A first embodiment of the apparatus includes a conventional cork center baseball having a hole drilled a portion of the way therethrough and a cord glued therein at one of its ends and attached to a handle at the other of its ends. A second embodiment of the invention comprises a baseball with a hole therein and a cord glued in the hole, the cord being attached to a boom rotatable about a fixed center. The boom is rotatably driven by a variable speed drive mechanism and is connected thereto through a slip clutch arrangement. The radius between the ball and the rotational center of the boom may be selectively varied to change the type of pitch as the ball passes the batter and the boom may be raised or lowered to selectively change the height of the pitch as it passes the batter. The radius and height is varied by conventional fluid cylinders.

3,588,105

GOLF DRIVING AID

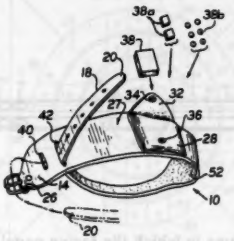
John J. Donohoe, 136 Bayview Ave., Amityville, N.Y.

Filed Oct. 13, 1969, Ser. No. 865,657

Int. Cl. A63b *17/00*

U.S. Cl. 273—32R **9 Claims**

A wristband mountable on a golfer's wrist has an elongated body portion on which is a pocket having a flap with the pocket containing a removable and interchangeable weight. A strap integral with one end of the body portion extends through a slot in the body portion around the body portion. The strap overlays the pocket to assist in holding it closed. The free end of the strap is engaged with a buckle at the other end of the body portion. The wristband which has a rough or suede underside is adjustable longitudinally and circumferentially on the golfer's wrist and is held in place frictionally when the strap is tightened. The added weight contained in the pocket effectively applies increased kinetic power to the swing of a golfer without unbalancing the hands holding the club.



3,588,106

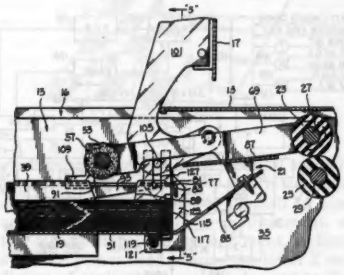
SHEET-FEEDING APPARATUS

Elmer L. Csaba, Highland Park, and Edward W. Engel, Northbrook, Ill., assignors to SCM Corporation, New York, N.Y.

Filed Feb. 20, 1969, Ser. No. 801,014

Int. Cl. B65h *1/04*

U.S. Cl. 271—61 **12 Claims**

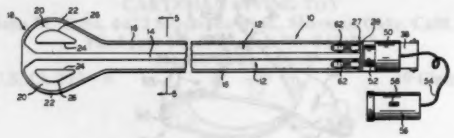


A photocopying machine has a storage compartment which is covered by a lid and contains a stack of copy paper sheets laterally confined between guide rails in a feeding position. Rotatably driven feed rollers advance the topmost sheet forwardly from the feeding position toward an exit throat, and the topmost sheet is separated from the remainder of the stack by corner separators engaging the forward corners of the stack. From the stack, the sheet moves through the exit throat which guides the incoming sheet into the nip of a pair of rotating rollers which remove the sheet from the compartment for further processing. To insert a fresh stack of sheets into the compartment, the feed rollers and the corner separators are supported for generally vertical movement and mechanically connected to the lid so as to move upwardly from the feeding position upon movement of the lid to uncover the compartment. The forward end of the stack is aligned with the corner separators by a pivotally supported stop member which is mechanically connected to the lid and pivotally moved into an upright position for engagement by the stack upon the uncovering movement of the lid. After the stack is properly inserted, the lid is moved to cover the compartment and moves the stop member from the upright position and moves the sheet advancing means and the corner separators onto the topmost sheet of the stack.

3,588,107
VIBRATING TRACK RACING GAME

Sam Kupperman, Chicago, and Dennis I. Kupperman, Des Plaines, Ill. both of 4139 Main St., Skokie, Ill., 60076

Filed Dec. 6, 1968, Ser. No. 781,755
Int. Cl. A63f 9/14
U.S. Cl. 273—86 8 Claims

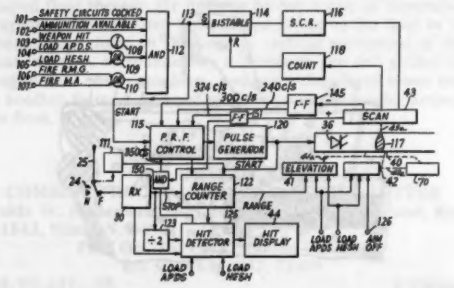


A toy racing game in which the racing panel is vibrated by a motor operating a rotatable member which engages means on the racing panel, and in which the racing members are supported on flexible legs so that as the racing panel is vibrated the racing members are propelled or moved on the racing panel.

3,588,108
WEAPON-TRAINING SYSTEMS

Peter Thomas Ormiston, Farnborough, England, assignor to The Solartron Electronic Group Limited, Farnborough, England

Filed Apr. 1, 1968, Ser. No. 717,802
Claims priority, application Great Britain, Apr. 11, 1967, 16490/67
Int. Cl. F41g 7/00
U.S. Cl. 273—101.1 13 Claims



A weapon-training system for assessing the accuracy of an aim in which an electromagnetic source, preferably a laser, is linked to an aiming device such as a sighting telescope for aiming at a target. The system includes a detector on the target for receiving the radiation and an indicator to provide information concerning the accuracy of the am. The linkage between the aiming device and the source includes a servomotor and a mechanical linkage for depressing the elevation of the beam with respect to the orientation of the aiming device as a function of the distance between the source and detector. The linkage may also include a servomotor and a mechanical linkage for altering the azimuth of the beam in response to information concerning relative movement of the detector.

3,588,109
MARBLE GAME WITH GYRATORY PICKUP CUP

Arnold J. Gunderson, Chicago, Ill., assignor to Chemtoy Corporation

Filed Mar. 26, 1969, Ser. No. 810,623
Int. Cl. A63b 0/00, 67/00
U.S. Cl. 273—109 1 Claim

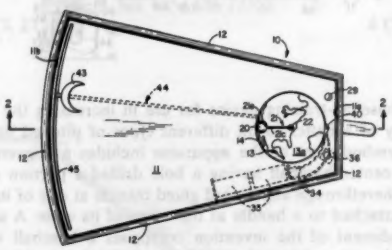
A game and a device for use in playing the game, in which two or more may participate. A plurality of spherical objects, e.g. marbles are disposed at a home base and the players transfer the same one by one from the base to a goal. The device comprises a cup having a frustoconical interior with its smaller end down and open. During play the cup is positioned with its open bottom over a marble and, upon imparting gyratory motion to the cup the marble will be given like motion to cause the same to rise in the cup and be held

therein by the gyratory motion as implemented by centrifugal force. Such motion is continued while the device and marble are transferred to the goal where, upon interruption of motion, the marble may be deposited thereat. Failure of a participant to sustain the required gyratory motion during transfer will allow the marble to drop out prior to reaching the goal.

3,588,110
MOVING TARGET AND ROTATING CENTRIFUGAL PROJECTOR

Richard F. Hirsch, 2654 Porter #6, Fullerton, Calif.

Filed Feb. 3, 1969, Ser. No. 795,843
Int. Cl. A63d 3/02; A63b 65/12, 71/00
U.S. Cl. 273—119 13 Claims



A game simulating translunar injection. The game includes a sector-shaped board, a rotatable turntable coplanar with the board at the narrow end thereof, and a moon-shaped target movable along an arcuate path across the wide end of the board. A ball rests in a detent on the turntable face, a push-button-actuated mechanism permitting selective release of the ball as the turntable is rotating, skill being required to release the ball at a proper time so that it will be propelled centrifugally toward the target.

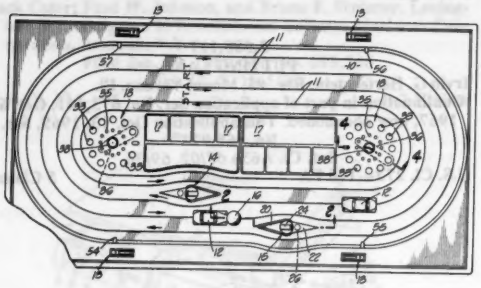
3,588,111
SLOT CAR GAME

B. Kumar Agarwala, Los Angeles, Calif., assignor to Revell Incorporated, Venice, Calif.

Filed Mar. 3, 1969, Ser. No. 803,605
Int. Cl. A63f 7/06
U.S. Cl. 273—119A 5 Claims

A plurality of individually driven slot cars on adjacent tracks engage and move a lightweight ball along the raceway for the game purpose of trying to push the ball into any one of several openings arranged in the course bed. Scoring of the game is accomplished when a ball enters such an opening

actuating a switch to provide an electrical indication of a score. Various obstructions are provided on the course for



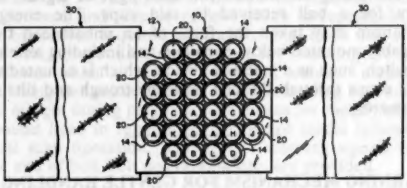
deflecting a ball from the control of a car driven by an unwary or unskillful player.

3,588,112

BOARD GAME INVOLVING THE MATCHING OF A RANDOMLY ARRAYED GROUP OF PIECES

Anatol W. Holt, Philadelphia, Pa., assignor to Stelledar, Inc., Philadelphia, Pa.

Filed Aug. 20, 1968, Ser. No. 753,949
Int. Cl. A63f 3/00
U.S. Cl. 273—130 13 Claims



A playing board for holding game pieces in an array. The playing board provides easy automatic randomizing of the array, clear display of significant array patterns, easy insertion and removal of pieces without disturbing adjacent pieces, and stability of positioned pieces. It includes a plurality of shallow circular depressions, with contiguous depressions having specific separating wall height limitations. The combination of a game board having a rectangular array of positions with the corner positions deleted, and a plurality of pieces sufficient to just cover all the positions, with the pieces having a plurality of differing markings, and the method of play utilizing the game board and pieces involving reproducing certain elements of order of the pieces in the array by withdrawing pieces from the array and placing them on a construction surface.

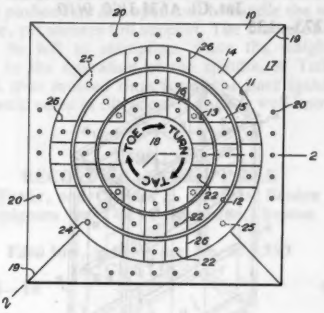
3,588,113

GAME BOARDS WITH PATTERN-CHANGING MEANS

John H. Nelson, Pleasant Hill, Calif. (1424 North Gene St., Tempe, Ariz. 85281)

Filed Apr. 7, 1969, Ser. No. 814,141
Int. Cl. A63f 3/00
U.S. Cl. 273—130 2 Claims

A game board having three concentric, rotatable rings, forming a part of the playing surface, each of which can be locked in any one of four equally angularly spaced positions. Four identical "Tic-Tac-Toe" patterns are formed by this alignment of the rings. The arrangements of playing pins or



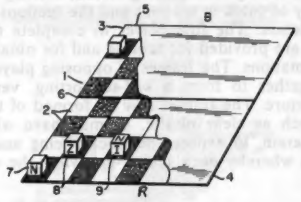
markers placed in the individual patterns are altered by rotation of the rings.

3,588,114

BOARD GAME APPARATUS

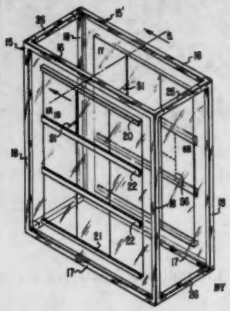
Charles B. Vogel, 5612 Wickersaam, Houston, Tex.

Filed Aug. 10, 1967, Ser. No. 659,627
Int. Cl. A63f 3/02
U.S. Cl. 273—131 10 Claims



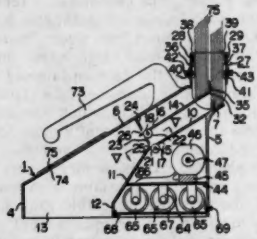
This board game apparatus has a group of specialized playing pieces, each with an identically imprinted adjustable indicium on one face. Each piece is adapted to continuously remind one player of its condition of adjustment, while concealing this information from his opponent. A first embodiment has cubical pieces each bearing the letter Z on one face as an indicium of rank which can be changed to N by orientational adjustment. The Z (or N) bearing face may be turned toward one player, thus continuously reminding him of the rank of the piece while concealing it from his opponent. A second embodiment has pieces in the form of short cylinders which respectively have an identical directional indicium on one flat face and one of several different symmetrical indicia on the other face. The directional indicia serve as identifying indicia which are adjustable by orientation, whereas the other different indicia are indicia of rank which may be turned downward and thus hidden. A third embodiment also has cylindrical pieces, one flat surface of each piece being rotatably adjustable with respect to the other, to exhibit one of three selectable rank indicia. This surface is initially turned down for concealment. Each of the other flat surfaces bears a different numerical pattern of dots as an identification of respective pieces after adjustment of the rank thereof. A fourth embodiment has cubical pieces, each bearing the letter Z as a rank indicium on an initially concealed lower surface. The Z can become N by orientational adjustment. The uppermost surfaces respectively bear symmetrical alphabetical indicia sufficient to spell several words. These serve to identify the pieces after adjustment. For use with the above pieces a special checker board is provided which is imprinted with the same letters used on the pieces and is suited for four person games. A track-type board also is provided, which has a separate track for each of four players.

3,588,115
CARD GAME APPARATUS
James William Nichols, Arcadia, Calif. (215 Bowery, New York, N.Y. 10002)
Filed Dec. 2, 1968, Ser. No. 780,522
Int. Cl. A63f *3/00, 9/10*
U.S. Cl. 273—135 8 Claims



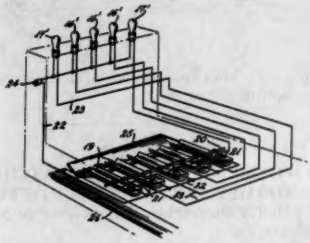
The game is played with transparent cards, each having a single color imprint. The object of the game is to assemble the cards in sections or stacks, and the stacks in rows, and, when properly assembled, the cards form a colored picture on a transparent base. The cards are shuffled and dealt to the players who play in turn. Each player assembles his cards in a frame means having card-holding means, thereby facilitating the assembly of cards in sections and the sections in rows to form the picture. The first player to complete the picture wins. Rules are provided for scoring and for obtaining other winning formations. The frames of opposing players may be secured together to form a self-supporting, vertically arranged structure. The frames may be formed of transparent material, such as clear plastic, or may have window-type openings therein, to expose the stacks being assembled by the players, whereby each player can view the opponent's stack.

3,588,116
CARD SHUFFLER
Kosaburo Miura, Tokyo, Japan, assignor to Mamoru Matsuoka, Funabashi-shi, Chiba-ken, Japan
Filed Feb. 5, 1969, Ser. No. 796,796
Claims priority, application Japan, Feb. 19, 1968, 43-14798
Int. Cl. A63f *1/12*
U.S. Cl. 273—149 3 Claims



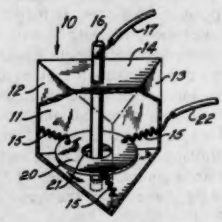
When a deck of playing cards is inserted into the casing of the shuffler, it is divided exactly into two equal groups by means of positioning plates and a divider blade, and the groups of cards slide down over a pair of parallelly disposed upper and lower shoots until they are stopped by gate plates, and then the cards of both groups are forced to slide down through clearances provided between the gate plates and the upper and lower shoots, one card at a time through each clearance, in such a manner that the cards so discharged alternatively fall onto the open bottom of the casing, or directly on the card table on which the shuffler is placed, in a single pile which upon removal of the shuffler from thereabove can be taken up as it is by the dealer or player for a next game.

3,588,117
PUTTING LANE
Irvin G. Hertenstein, Rte. #5, Mount Vernon, Ill.
Continuation-in-part of application Ser. No. 673,441, Oct. 6, 1967, now abandoned. This application Oct. 13, 1969, Ser. No. 868,974
Int. Cl. A63b *67/02, 69/36*
U.S. Cl. 273—176 FA 5 Claims



A putting lane including a simulated grass carpet with cups having different scoring values and adapted to receive a golf ball putted along said lane, an electric light or signal for each cup, energizing mechanism for each light or signal, and a return for a ball received in said cups. The energizing mechanism may taken the form of an unbalanced trough swingably mounted below each cup and including an electrical switch, such as a mercury switch, which is actuated when a ball drops through the cup onto the trough and tilts same downwardly.

3,588,118
WARNING MECHANISM FOR GENTLE HANDLING OF DOLL
William J. Pipa, 1610 Gilford Ave., New Hyde Park, N.Y.
Filed June 19, 1968, Ser. No. 738,162
Int. Cl. A63h *3/33;* G11b *19/00*
U.S. Cl. 274—1 2 Claims



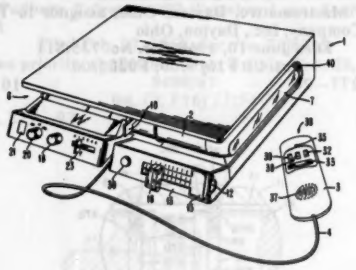
This invention relates to a warning device that is activated by rough handling. It is particularly adapted to dolls and like toys. The mechanism comprises an electrical system having an impact operated switch. This switch comprises spaced-apart electrical contacts which are momentum actuated by rough handling. The switch may be a pair of rigid contacts one of which is swingable or it may be a switch of greater sensitivity wherein one of the contacts is a suitable metal spring.

3,588,119

DICTATING AND TRANSCRIBING APPARATUS WITH RAPID TRANSCRIBER ALIGNMENT AND MOVEMENT FACILITIES

Jack Cater; Fred W. Johnson, and Bruno F. Wehmer, Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 19, 1968, Ser. No. 699,246
Int. Cl. G11b 5/00
U.S. Cl. 274—4J 7 Claims



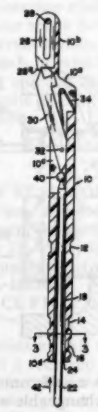
The invention concerns dictating and transcribing apparatus using a magnetic belt record media and having a variety of automatic and semiautomatic features. The dictating unit has an associated microphone with control buttons for establishing modes of operation, initiating forward and backspacing movements, controlling the marking of an index slip, and similar operations. The transcribing unit has an associated head set and foot control and various operating controls, provided on the front of the transcribing unit. Transcribing operations are under control of a foot pedal and include starting and stopping of the belt movement, a symmetrical forward and reverse review which is repeatable, and other operations required for transcribing. Each unit is provided with independent mechanisms for restoring the sound transducer when a belt is unloaded; control means for establishing one initial margin during recording and another initial margin during playback; and means for rapidly aligning the sound head in relation to the record media following a manual scan operation. Appropriate warning signals to indicate end of belt, belt positioning, etc. are provided.

3,588,120

PLASTIC RECORD TURNTABLE SPINDLE

Jack E. Bayha, 11753 Sperry Road, Chesterland, Ohio

Filed Apr. 21, 1969, Ser. No. 818,017
Int. Cl. G11b 17/04
U.S. Cl. 274—10 6 Claims



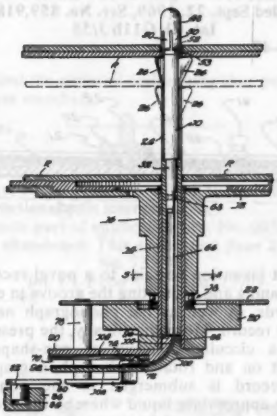
The invention relates to a plastic spindle for a record turntable. Specifically, the invention relates to a spindle formed either by injection molding or otherwise molding to spindle shape of high-strength plastic while still allowing the spindle to function in exactly the same manner it has heretofore. The round portion of the interior is tapered, and a ring of the same material as the interior, preferably molded in the same die, is pushed into the open end to handle the necessary tapered hole, yet assures full support. The blades of the spindle are to be left as stampings, since the weight is advantageous in the operation of the spindle. A Teflon tube heat shrunk over molded rings forms the base spindle bearing. The plastic value in filtration of noise is well known.

3,588,121

RECORD CHANGER SPINDLE

Gerald H. Freier, and Charles E. Zanders, Benton Harbor, Mich., assignors to V-M Corporation, Benton Harbor, Mich.

Filed Nov. 3, 1969, Ser. No. 873,593
Int. Cl. G11b 17/04
U.S. Cl. 274—10 9 Claims



Record-supporting fingers ride in vertical slots in the center spindle of a record changer between an upper storage position and a lower playing position on the turntable. These supporting fingers are pivotally mounted on a carriage which is slidably disposed within the hollow bore of the center spindle and is actuated by an elongated flexible tape having one end secured to the lower end of the carriage and its opposite end coupled to the free end of a horizontally operating arm. The flexible tape is guided in a trackway having vertical and horizontal portions interconnected by a curved channel portion at the base of the center spindle, the flexible tape moving therethrough freely to positively raise and lower the carriage in response to horizontal movement of the arm.

3,588,122

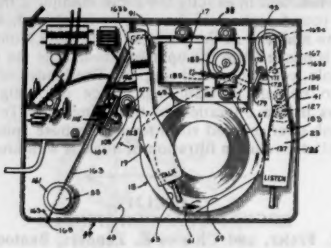
PORTABLE RECORDING APPARATUS AND MEDIA THEREFOR

L. James Kingsbury, and Adelore F. Petrie, Decatur, Ill., assignors to General Electric Company

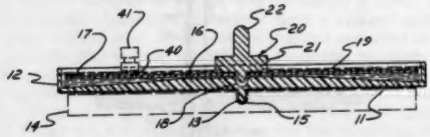
Continuation of application Ser. No. 518,351, Jan. 3, 1966, now abandoned. This application Nov. 18, 1968, Ser. No. 795,373
Int. Cl. G11b 3/00
U.S. Cl. 274—39 4 Claims

A recording and reproducing apparatus for embossable recording and playback of sound relative to a thin plastic disc, the thin plastic record disc being of noncircular

periphery to enable its periphery to be driven by a similarly configured recess of a turntable. The record disc may be specially configured and dimensioned for compact cooperation with a standard sized mailing envelope.

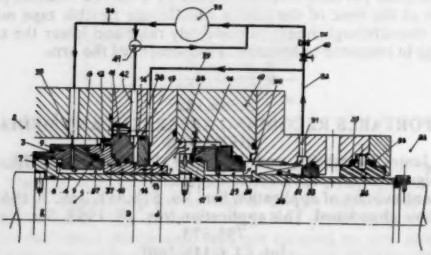


3,588,123
RECORD-CLEANING DEVICE
Vick C. Candella, 6509 Pilgrim St., Metairie, La.
Filed Sept. 22, 1969, Ser. No. 859,918
Int. Cl. G11b *3/58*
U.S. Cl. 274—47 **5 Claims**



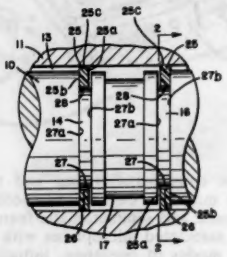
The present invention pertains to a novel record-cleaning device for cleaning and protecting the groove in conventional musical records, as well as the phonograph needle during playing of the record. More specifically, the present device is directed to a circular concave or pan-shaped member adapted to fit on and rotate with a phonograph turntable wherein a record is submerged in the concave-shaped member in an appropriate liquid whereby the record, among other advantages, is cleaned during its playing.

3,588,124
SEALING DEVICE FOR PUMPS AND OTHER SIMILAR MACHINES
Paul Andre Guinard, St. Cloud, France, assignor to Etablissements Pompes Guinard, Societe Anonyme, Saint-Cloud, France
Filed Dec. 16, 1968, Ser. No. 784,089
Claims priority, application France, Dec. 18, 1967, 132668
Int. Cl. E21b *33/00*
U.S. Cl. 277—3 **9 Claims**



A sealing device for pumps, compressors and other similar machines which develop high pressures. The sealing device comprises at least a normally operative packing and standby normally inoperative packing which becomes operative when the normally operative packing fails. The standby packing is fitted upstream of the normally operative packing and is automatically rendered operative by a displaceable plunger device which is responsive to fluid pressure prevailing in a chamber supplied with leakage fluid recovered at the outlet side of the downstream normally operative packing when the normally operative packing becomes defective.

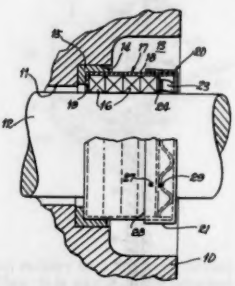
3,588,125
RING SEAL ASSEMBLY
Frank J. Mastromatteo, Dayton, Ohio, assignor to The Duriron Company, Inc., Dayton, Ohio
Filed June 10, 1968, Ser. No. 735,811
Int. Cl. F16j *9/00*; **F02f** *5/00*
U.S. Cl. 277—26 **10 Claims**



A seal assembly for a shaft and a housing wherein one rotates relative to the other includes a filled polytetrafluoroethylene (PTFE) seal element which is split and includes flexible and movable overlapping free ends in opposed sealing relation at ambient temperature. As the temperature increases, the seal element tends to grow so that one of the free ends seals against one of the radial faces of the seal element. As the temperature drops from ambient the seal contracts so that the opposed faces are in sealing engagement. The seal is energized into sealing engagement by the fluid being sealed.

Reference is made to application Serial No. 735,812, filed of even date herewith and assigned to the same assignee.

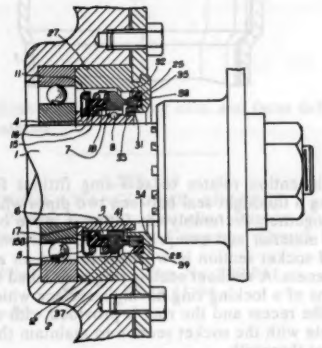
3,588,126
UNIT-TYPE PACKING SEAL FOR SHAFT
George R. McKillop; Harry Tankus, and James H. Thayer, Cook County, Ill., assignors to Crane Packing Company, Morton Grove, Ill.
Filed May 16, 1969, Ser. No. 825,177
Int. Cl. F16j *15/00*; **F02f** *5/00*
U.S. Cl. 277—32 **7 Claims**



This invention comprises a self-contained unitary packing device which may be interchangeable with a rotary mechanical seal. The packing device comprises a cup-shaped metal container in which is disposed one or more rings of packing together with a spring which exerts an axial force upon the packing in the manner of a packing gland. The container is

pressed into a cup-shaped rubber seat in a recess in the housing to seal it in the housing and to hold it against rotation with a shaft passing through. The spring holds the packing rings against the container and compresses the rings against the shaft. The cup-shaped rubber seat may be used alternatively to hold a sealing washer of a rotary mechanical seal adapted to fit into the same space.

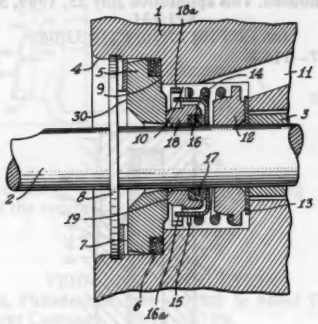
3,588,127
SEAL FOR RELATIVELY ROTATING MEMBERS
Edgar Padbury Coleman, 197 Tentelow Lane, Southall, England
Filed Feb. 27, 1968, Ser. No. 708,712
Claims priority, application Great Britain, Feb. 28, 1967, 9400/67
Int. Cl. F16j *15/54*
U.S. Cl. 277—92 **5 Claims**



A device for making fluidtight joints between a relatively rotating shaft and casing as in U.S. Pat. No. 2,713,504 has the fluidtight connection between the fast member and the casing made by an L-section elastomeric cuff, the axial limb of which fills an annular space between an internal surface of the casing and an external surface of the fast member and the inwardly extending limb of which contacts an external surface within the casing and fills the space between the end of the fast member opposite to the rubbing surface and a transverse surface in the casing.

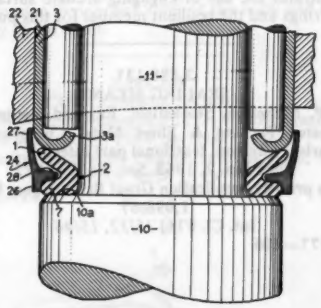
3,588,128
ROTARY SEAL, FOR OIL PUMPS
Jorgen Hartvig Petersen, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark
Filed May 15, 1968, Ser. No. 729,337
Claims priority, application Germany, May 16, 1967, D53092
Int. Cl. F16j *15/34, 15/54*
U.S. Cl. 277—93 **7 Claims**

A rotary seal comprises a shaft rotatably mounted in a hollow housing which has a recessed portion. Within this recess there is a ring-shaped seat portion disposed coaxially with the shaft. A stationary bearing seat member comprising a sintered carbon ring having a flat bearing surface is pressed against the ring-shaped seat by spring means. The surface of the carbon ring opposite the flat bearing surface is preferably impregnated with a material such as a metal to avoid porosity. However the impregnating material does not reach the flat bearing surface. A rotatable metal sealing ring member is



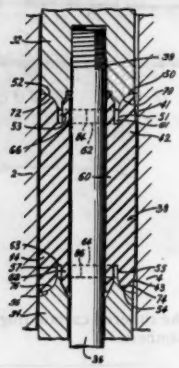
pressed against the sintered carbon ring thus producing a seal between these members.

3,588,129
SEALING DEVICE
Alfred Pitner, Paris, France, assignor to Nadella S. A., Paris, France, fractional part interest
Continuation-in-part of application Ser. No. 605,830, Dec. 29, 1966, now abandoned. This application June 25, 1968, Ser. No. 739,760
Int. Cl. F16d *3/26;* **F16j** *15/04*
U.S. Cl. 277—95 **17 Claims**



A sealing device, adapted to be disposed between a bearing and a journal which is disposed in the bearing and has a shoulder, comprises an elastomer V-section ring having two lips applied respectively in contact with the bearing and the journal shoulder and a protecting element encompassing and centered by the ring. The protecting element comprises a relatively rigid annular element which is centered relative to the ring and includes an annular wall which protects at least one of the lips of the ring. Preferably the protecting element has a stiffening rib extending radially between the lips and a skirt portion which extends axially from the rib and overlaps the adjacent end of the bearing.

3,588,130
SEAL
John H. Fowler and David P. Herd, both of Houston, Tex., assignors to Rockwell Manufacturing Company, Houston, Tex.
Continuation of application Ser. No. 606,778, Jan. 3, 1967, now abandoned. This application July 25, 1969, Ser. No. 871,731
Int. Cl. F16j 15/56; E21b 33/08
U.S. Cl. 277—116.8 12 Claims

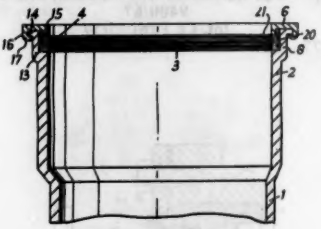


This specification discloses a sealing device especially designed to seal between concentric tubular members. The sealing device disclosed includes a pair of rigid retaining rings with a resilient packing member between them. Means are provided on the retaining rings for causing the edges of the resilient packing member to flow outwardly into engagement with the concentric tubular members when the retaining rings are forced toward each other. The specific embodiment illustrates the use of engaging arcuate surfaces on the retaining rings and the resilient member for this purpose.

3,588,131
SEALING MEANS
Terence P. Nicholson, Stocksfield, England, assignor to The Corrugated Packing & Sheet Metal Company Limited, Hamsterley, England, fractional part interest
Filed Jan. 2, 1968, Ser. No. 694,622
Claims priority, application Great Britain, Jan. 9, 1967, 1,098/67
Int. Cl. F16j 15/32, 15/48
U.S. Cl. 277—206 12 Claims

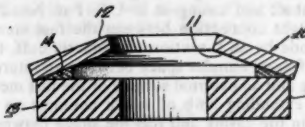
A sealing washer or gasket has a hollow section formed by walls which converge but leave at least one opening between the hollow section and the high-pressure side of the seal so that an increase in fluid pressure has the effect of urging the walls outwardly thus tending to increase the sealing pressure with the surfaces between which it is located. Means are provided to prevent the opening being entirely closed by the normal pressures used to clamp the parts sealed by the washer or gasket.

3,588,132
SEAL RING FITTINGS FOR PIPES
Ronald Edmondson, Chislehurst, England, assignor to Plastiers Limited of Nathan Way, Woolwich Industrial Estate, London, England
Filed Oct. 28, 1968, Ser. No. 771,226
Claims priority, application Great Britain, Oct. 30, 1967, Mar. 20, 1968, 49214/67;13548/68
Int. Cl. F16j 15/10
U.S. Cl. 277—207 8 Claims



This invention relates to seal ring fittings for pipes for providing a fluidtight seal between two pipes which are to be joined together. Preferably the fitting is made of a synthetic plastics material and comprises a body portion including a terminal socket section in which is formed an annular open ended recess. A resilient sealing ring is retained in this recess by means of a locking ring having a surface which closes the end of the recess and the ring is provided with means which cooperate with the socket section to maintain the ring in engagement therewith.

3,588,133
COMPOSITE ANNULAR SEALING ELEMENT
Thomas A. Caserta, 3335 Quaker Bridge Road, Trenton, N.J.
Filed July 7, 1969, Ser. No. 839,314
Int. Cl. F16j 15/12
U.S. Cl. 277—235R 2 Claims

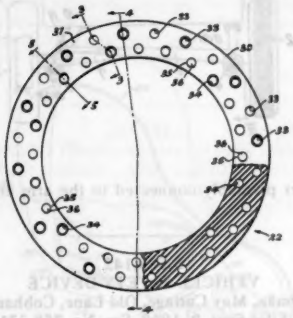


An improved sealing device for attaching threaded fasteners is provided which utilizes an elastomeric laminate of annular configuration which is peripherally retained within a concave relatively rigid annular member.

3,588,134
PISTON BEARING
Ward Sievenpiper, Milgrove, N.Y., assignor to "Automatic" Sprinkler Corporation of America, Cleveland, Ohio
Filed Sept. 25, 1969, Ser. No. 861,033
Int. Cl. G16j 9/00
U.S. Cl. 277—235 9 Claims

A bearing for pistons and the like including synthetic plastic material forming the outer bearing surface over a generally ring-shaped supporting member of metal. The sup-

porting member includes a series of studlike projections on each axial end face thereof, and the outer surface of the pro-



jections are flush with the bearing axial end faces defined by the plastic material.

3,588,135
QUICK-CHANGE TOOL ADAPTER

Raymond J. Porter, Panania, Australia, assignor to Gulf & Western Industrial Products Company, Grand Rapids, Mich.

Filed Jan. 9, 1969, Ser. No. 790,061
Int. Cl. B23b *31/04*
U.S. Cl. 279—83 **4 Claims**

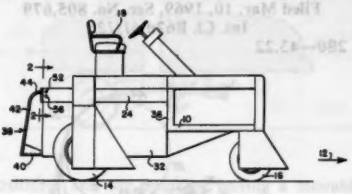
A tool holder to engage a tool element shank comprising a body portion including a socket formed therein, and a cylindrical bushing seated within said socket including generally coaxial cylindrical inner and outer surfaces, said inner surface being longitudinally slotted or relieved to define at least two longitudinally extending spaced lands which accurately register the tool element shank radially within the tool holder. Means are provided to press the tool element shank against the bushing lands, and cooperating pin and slot means accurately register the tool element shank longitudinally or axially within the tool holder socket.

3,588,136
VEHICLE-MOUNTED RECEPTACLE

Francis Edward Schlueter, Des Moines, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Sept. 15, 1969, Ser. No. 857,785
Int. Cl. B60p *3/22*
U.S. Cl. 280—5A **10 Claims**

A vehicle-mounted receptacle including cooperative fore-and-aft guide and support means enabling lengthwise sliding installation of the receptacle and operator-mountable step

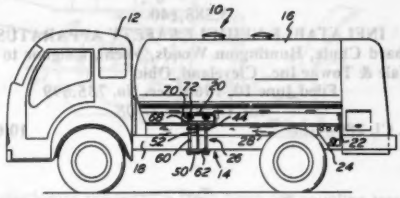


means including mounting means blocking lengthwise removal of the receptacle.

3,588,137
VEHICLE CONSTRUCTION

Louis Field, Philadelphia, Pa., assignor to Allied Tank Truck Equipment Company, Collegeville, Pa.

Continuation-in-part of application Ser. No. 662,181, Aug. 21, 1967, now Patent No. 3,463,501. This application Aug. 25, 1969, Ser. No. 852,950
Int. Cl. B60p *3/22*
U.S. Cl. 280—5 **9 Claims**

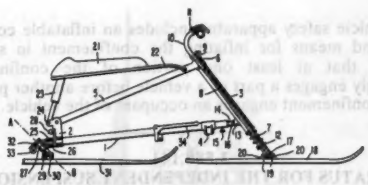


A vehicle body is coupled to a chassis by a rearwardly located transverse pivot, and by pairs of resilient clamping members coupled to opposite sides of the body and the chassis forwardly of the pivot.

3,588,138
COLLAPSIBLE SKI-BOB

Anton Cerny, Jr., 10 Siedlergasse 1233, Vienna, Austria

Filed Jan. 30, 1969, Ser. No. 795,219
Claims priority, application Austria, Jan. 31, 1968, A976/68
Int. Cl. B62b *13/04*
U.S. Cl. 280—16 **6 Claims**

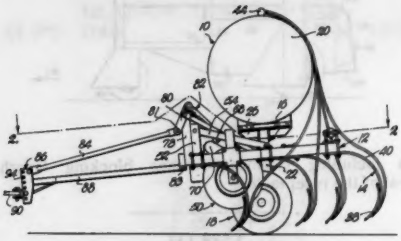


A ski-bob employs a steerable front ski and two rear skis, each ski being suspended to provide both rocking and tilting motion thereof. The rear skis are connected by a parallelogram link-type structure which is fastened to the front steering mechanism by two inclined members, on the upper of which the seat is attached. Through a clamp member and a pivot attachment connected to the steering column, rotation thereof enables the ski-bob to be collapsible whereby it may be easily transported.

3,588,139
IMPLEMENT FOR APPLYING FERTILIZER

William Elbert Bayne, Independence, Mo., assignor to Clark Manufacturing Company, Atherton, Mo.

Filed Mar. 10, 1969, Ser. No. 805,679
Int. Cl. B62d *61/12*
U.S. Cl. 280—43.22 5 Claims

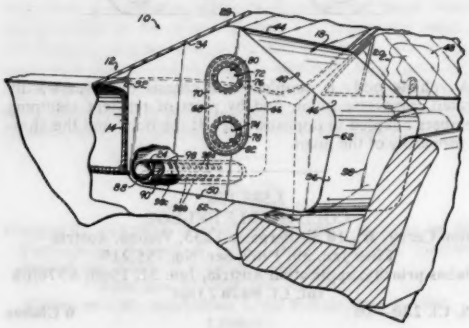


A fertilizer applying implement provided with separate frames for the ground-penetrating tools and the fertilizer tank respectively. Four-point linkage interconnecting the frames permits raising and lowering of the tools independently of the tank supporting frame to conserve the power requirements for operation of the implement.

3,588,140
INFLATABLE VEHICLE SAFETY APPARATUS

Richard Chute, Huntington Woods, Mich., assignor to Eaton Yale & Towne Inc., Cleveland, Ohio

Filed June 10, 1968, Ser. No. 735,699
Int. Cl. B60r *21/08*
U.S. Cl. 280—150 10 Claims



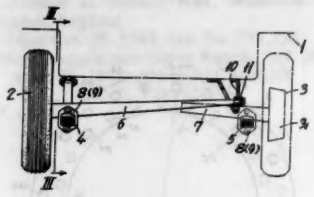
A vehicle safety apparatus includes an inflatable confinement and means for inflating the confinement in such a manner that at least one portion of the confinement abuttingly engages a part of a vehicle before another portion of the confinement engages an occupant of the vehicle.

3,588,141
APPARATUS FOR THE INDEPENDENT SUSPENSION OF THE WHEELS OF A MOTORCAR

Soichiro Honda, and Hideo Masui, Tokyo, Japan, assignors to Honda Giken Kogyo Kabushki Kaisha, Tokyo, Japan

Filed Feb. 27, 1969, Ser. No. 802,891
Claims priority, application Japan, Feb. 29, 1968, 43/15930
Int. Cl. B60g *3/06*
U.S. Cl. 280—124 7 Claims

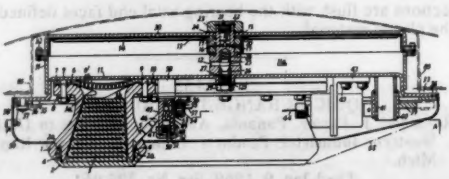
Each wheel of a motorcar is attached to a supporting arm having a free end, remote from the wheel, pivotably connected to the body of the motorcar so that the wheel can move up and down, the supporting arm being attached to a set of longitudinal leaf springs proximate the wheel to cause the springs to flex as the wheel moves up and down. Each arm is connected to the associated set of leaf springs by a link member pivotably connected to the arm and the set of springs.



3,588,142
VEHICLE SAFETY DEVICE

John F. Gorman, May Cottage, Old Lane, Cobham, England

Filed Sept. 9, 1968, Ser. No. 758,331
Int. Cl. B60r *21/06*
U.S. Cl. 280—150 42 Claims

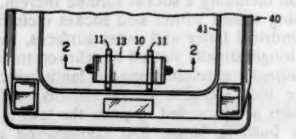


The invention provides a safety device whereby a shield of resilient material is rapidly formed to protect an occupant of a vehicle in the event of rapid deceleration or imminent collision. Formation of the shield may be automatic, being controlled by suitable instruments of the vehicle, but may alternatively or in addition be manually actuated. The shield is an expandable element which is rapidly expanded to its operative position by a prepressurized filler material when actuated, being normally held in a retracted position by release means. The shield may be positioned wholly or partly to surround portions of the body of an occupant of the vehicle, or may be provided exteriorly of the vehicle to cushion impact on collision.

3,588,143
STABILIZER FOR AN AUTOMOBILE

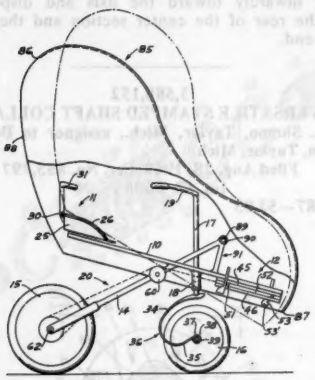
Robert D. Heitert, c/o Mike Machine & Mfg. Co., 1619 N. Hanley Road, St. Louis, Mo.

Filed Sept. 9, 1969, Ser. No. 856,927
Int. Cl. B60r *27/00*
U.S. Cl. 280—150 13 Claims



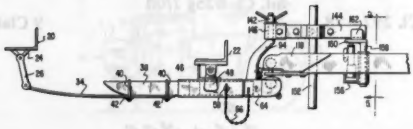
The stabilizing device includes an inertia block reciprocatively mounted by means of ball bearings within a housing which is rigidly attached to the vehicle to be stabilized. A preloaded compression spring extends between each end of the housing and the inertia block, and adjustable impact studs are located at each end of the housing a short distance from the inertia block in the rest position. The inertia block is relatively free to move against the compression springs, such movement being curtailed by impact of the block against one of the studs depending on the direction of change of movement of the vehicle.

3,588,144
CYCLE CONSTRUCTION
Guillermo Solomon Padial, Apartado 13068, Madrid, Spain
Filed Apr. 9, 1969, Ser. No. 814,746
Int. Cl. B62m 11/04
U.S. Cl. 280—236 12 Claims



The cycle comprises a saddle mounted on its frame to the rear of the handlebars and a pedaling mechanism mounted on its frame in front of the handlebars, the pedaling mechanism being of a reciprocating construction and connected to the rear wheel by lengths of driving chain.

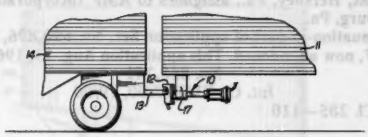
3,588,145
TRAILER HITCH
Woodrow F. Thompson, Box 27, Forest, Miss.
Continuation-in-part of application Ser. No. 642,628, May 4, 1967, now abandoned, which is a continuation-in-part of application Ser. No. 612,988, Jan. 31, 1967, now abandoned.
This application Feb. 25, 1969, Ser. No. 807,478
Int. Cl. B62d 53/00; B60d 1/06
U.S. Cl. 280—406 26 Claims



A trailer hitch is provided with guide means to facilitate the automatic coupling thereof comprising a sloping guide plate secured to the vehicle portion of the trailer hitch for guiding the connecting element on the trailer portion into mating relationship with the connecting element secured to the vehicle as the vehicle backs into position. The trailer hitch is also provided with a safety load equalizing device and draft-stabilizing means as well as an antijacknife device.

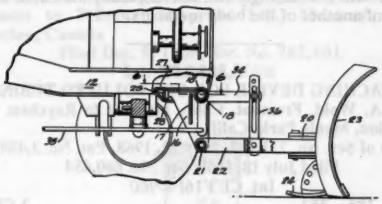
3,588,146
TRUCK AND TRAILER CONNECTOR
Marion R. Haddox, 1112 12th St., Parker, Ariz.
Filed Mar. 3, 1969, Ser. No. 803,835
Int. Cl. B60d 1/04
U.S. Cl. 280—478 3 Claims

The invention provides a heavy-duty truck and trailer connector employing a rectangularly tubular bar terminally carrying a coupling and accommodated for longitudinal and lateral movements within a trailer-suspended mounting which supports also a fluid powered bar-locking unit, the bar having associated wedge guide means for alignment of the bar from



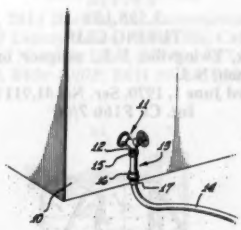
lateral positions, and the coupling having a movable latch element actuable by a second fluid-powered unit.

3,588,147
FRONT HITCH
Edward W. Enters, Fredonia, Wis., assignor to Gilson Bros. Co., Plymouth, Wis.
Division of Ser. No. 688,882, Dec. 7, 1967, Pat. No. 3,483,938.
Filed Jan. 9, 1969, Ser. No. 821,525
Int. Cl. B60d 1/00
U.S. Cl. 280—481 5 Claims



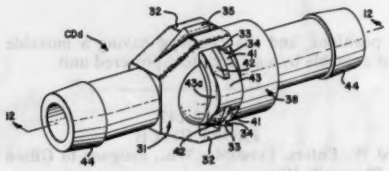
This disclosure relates to a front hitch for coupling tractor attachments to the front of the tractor, the tractor front having side beams with laterally aligned pin sockets, the attachment having a hanger bracket removably received between the beams and having a cross tube which aligns with the pin sockets, and trunnion pins telescopically receivable through the sockets and into the ends of the cross tube to couple the hanger bracket to the tractor.

3,588,148
NONKINK TRANSITION TUBE
Robert Barsumian, P.O. Box 431, La Canada, Calif.
Filed Sept. 4, 1969, Ser. No. 855,207
Int. Cl. F16l 11/00
U.S. Cl. 285—8 6 Claims



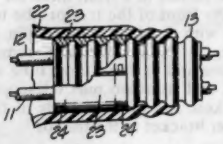
Nonkink transition tube adapted for coupling a hose to the bib nozzle of a faucet to eliminate kinking of the hose adjacent its intake end and comprising a flexible but relatively stiff section of a tubular construction with end fittings suitable for connecting at one end to a bib nozzle and at the other end to a fitting on a hose and of such length as to stiffly yield without kinking when the hose is drawn away or swung around in its ordinary manipulation.

3,588,149
VACUUM OR PRESSURE COUPLING DEVICES
Henry William Demler, Sr., Lebanon, and Edward Landis Weist, Hershey, Pa., assignors to AMP Incorporated, Harrisburg, Pa.
Continuation-in-part of application Ser. No. 690,896, Dec. 15, 1967, now abandoned. This application Aug. 13, 1969, Ser. No. 858,241
Int. Cl. F16l 47/00, 39/00
U.S. Cl. 285—110 1 Claim



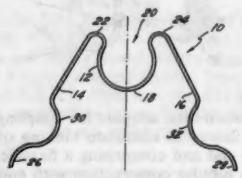
A vacuum or pressure coupling device comprises mateable body members each provided with means for connection to tubular members and each provided with means for maintaining the body members in engagement, one of the body members being provided with a stiffly flexible sealing member which is sealingly and telescopically mateable with a section of another of the body members.

3,588,150
ATTACHING DEVICE FOR CONVOLUTED TUBING
Robert A. Wold, Fremont, Calif., assignor to Raychem Corporation, Menlo Park, Calif.
Division of Ser. No. 731,087, May 22, 1968, Pat. No. 3,488,073. Filed July 18, 1969, Ser. No. 860,454
Int. Cl. F16l 47/00
U.S. Cl. 285—381 3 Claims



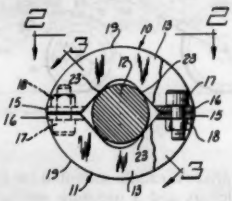
A device for attaching convoluted tubing to connector backshells or the like in which a split ring or collar is positioned over the end of the convoluted tubing and then positioned within another member such as an end bell having an internal groove for receiving the adapter ring and locking it and the tubing in position.

3,588,151
TUBING CLIP
Edward Korenz, Ewingville, N.J., assignor to Fedders Corporation, Edison, N.J.
Filed June 1, 1970, Ser. No. 41,911
Int. Cl. F16b 7/00
U.S. Cl. 287—1 2 Claims



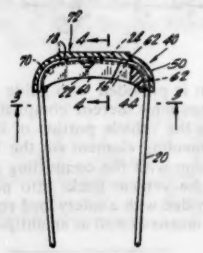
An improved clip is provided for use in securing a first section of tubing with respect to two other spaced-apart tubing sections. The clip comprises a unitary, irregularly shaped member formed of a resilient material having a cross sectional configuration symmetric about an axis. A center section defining the major portion of a circle is bisected by the axis and has an open front end and closed rear end. Wings integral with the center section extend rearwardly toward free ends on both sides of the axis from the open end of the center section. Indentations are formed in each of the wings extending inwardly toward the axis and disposed intermediate the rear of the center section and the associated wing-free end.

3,588,152
VERSATILE STAMPED SHAFT COLLAR
Robert D. Shomo, Taylor, Mich., assignor to Develco Corporation, Taylor, Mich.
Filed Aug. 28, 1969, Ser. No. 853,797
Int. Cl. B60b 27/06
U.S. Cl. 287—52.03 3 Claims



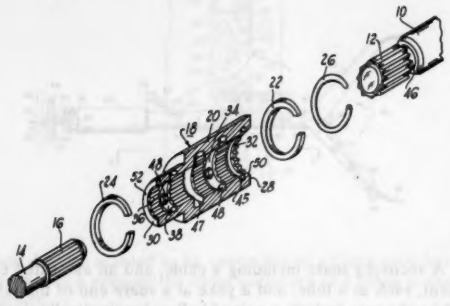
A split stop collar for use on shafts and other products. The stop collar includes two symmetrical half sections. Each half section comprises two substantially arcuate sidewall plates connected at their outer ends by lug plates. The four sidewall plates provide eight points of gripping contact with a shaft. The lug plates on the two half sections are fastened together by allen-head screws and nuts to clamp the stop collar on a shaft.

3,588,153
WIRE-HANDLE-JOINING MEANS
Allan H. Willinger, New Rochelle, N.Y., assignor to Metaframe Corporation
Filed July 23, 1968, Ser. No. 746,802
Int. Cl. B25g 1/00
U.S. Cl. 297—78 9 Claims



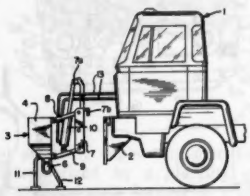
This invention is directed to means for joining the free ends of a wire handle, such as in a fish net, which comprises a sleeve adapted to overlie said free ends and thus cause them to resultingly be drawn towards each other, and preferably into abutting relation and a locking member adapted to be slidingly secured inside said sleeve so as to lock said ends together.

3,588,154
TORQUE COUPLING DEVICE
Robert W. Voight, and Robert C. Moore, Jr., South Bend, Ind., assignors to The Bendix Corporation
Filed Oct. 29, 1968, Ser. No. 773,367
Int. Cl. F16d 1/00
U.S. Cl. 287—108 9 Claims



The present invention relates to a torque coupling device for transmitting rotary motion comprising a sleeve member having internal splines therein and an annular groove adjacent each end, and which grooves contain resilient C-ring elements capable of cold-flowing into radial holes spaced around the periphery of each groove.

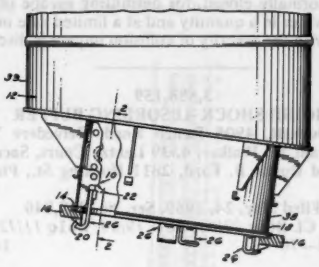
3,588,155
SANDING HOPPER
Walter Hirt, St. Blasien/Black Forest, Germany, assignor to Ing. Schmidt, Alfred, Blasien/Black Forest, Germany
Filed Jan. 28, 1969, Ser. No. 794,499
Claims priority, application Germany, Feb. 24, 1968, P 16 55 214.0
Int. Cl. B60b 39/04; B61c 15/10; B67d 5/64
U.S. Cl. 291—1 5 Claims



The sanding apparatus comprises at least one storage hopper which is removably mounted on an attachment frame on the front of a vehicle and has sanding chutes located directly in front of before the front wheels of the vehicle. The hopper is preferably provided with support legs and is connected to a suspension frame by means of pivotal levers controlled by a hydraulic or pneumatic jack.

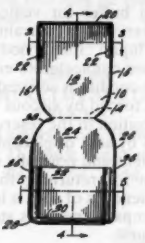
3,588,156
ADJUSTOCLAMP
Frank J. Bognar, Rochester, and Robert J. Gavagan, Center Line, Mich., assignors to the United States of America as represented by the Secretary of the Army
Filed June 17, 1969, Ser. No. 833,908
Int. Cl. E05c 15/00; A42j 36/10; B63h 19/12
U.S. Cl. 292—113 6 Claims

An adjustable clamp comprising an overcenter locking lever and a swing bolt pivotably connected thereto with a catch member rotatably and slidably mounted on the swing bolt. The catch member is a combination hook for engaging a strike and an adjustment tool operable upon its axial and



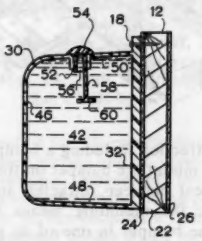
rotational movement on the swing bolt, to cooperatively engage a nut threaded on the bolt for adjustment of the tension of the clamp.

3,588,157
TAMPER INDICATING SEALS
Victor R. Tritton, Montreal North, Quebec, and Jean Painaud, St. Francois, Ville Laval, Quebec, Canada, assignors to Tritton Enterprises Ltd., Montreal, North, Quebec, Canada
Filed Dec. 9, 1968, Ser. No. 782,401
Int. Cl. B65d 55/06
U.S. Cl. 292—322 6 Claims



In this invention, there is provided a tamperproof seal having a cover and body portion in which the cover and body are each provided with cooperating locking means camming against each other when closed so that any attempt to open the seal increases the camming action by the respective locking means.

3,588,158
LIQUID FILLED SHOCK ABSORBING MODULAR BUFFER
Duane B. Ford, 2811 Hocking St., Sacramento, and Grant W. Walker, 4339 Lancey Court, Placerville, Calif.
Filed Nov. 20, 1968, Ser. No. 777,316
Int. Cl. B60r 19/08; B61f 19/04; F16h 9/10
U.S. Cl. 293—1 3 Claims



The combination of a nearly rigid strongly resilient backing board formed of a laminated wood core and resin bonded

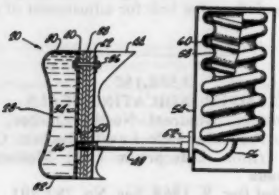
fiber glass surfaces with a shock-absorbing buffer member of the type which comprises a resilient hollow body member normally filled with water having one or more openings, which are normally closed, for permitting escape of at least part of the water in a quantity and at a limited rate only commensurate with the severity of collision impact is disclosed.

3,588,159

LIQUID SHOCK ABSORBING BUFFER

John W. Duckett, 4905 Ranch Road, Belvedere Tiburon, Calif.; Grant W. Walker, 4339 Lantzy Court, Sacramento, Calif., and Duane B. Ford, 2811 Hocking St., Placerville, Calif.

Filed Mar. 24, 1969, Ser. No. 809,840
Int. Cl. B60r *19/08;* **B61f** *19/04;* **B61q** *11/12*
U.S. Cl. 293—70 **14 Claims**



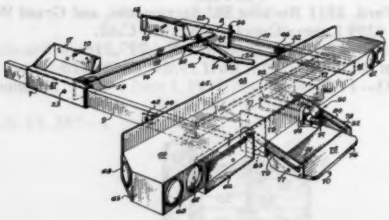
A shock absorbing buffer for vehicles which includes a rigid backing member and a plurality of resilient shape retaining normally liquid filled body members secured thereto with a reservoir connected to each of the body members is disclosed. The conduit is so sized and constructed that upon impact liquid is forced by viscous flow through the conduit to a displaced position in the reservoir, the energy of impact being dissipated by said displacement and viscous flow. The reservoir is resilient and normally returns to a minimum containment position for returning the liquid to the body member but the resiliency is of such a low degree that no significant amount of impact energy is stored in the resiliently expansible reservoir unit.

3,588,160

SHIFTABLE BUMPER

Ralph E. Reiner, Chestnut Ridge Road, Orchard Park, N.Y.

Filed Sept. 23, 1968, Ser. No. 761,754
Int. Cl. B60d *1/06;* **B60r** *19/04;* **B61d** *23/00*
U.S. Cl. 293—73 **11 Claims**



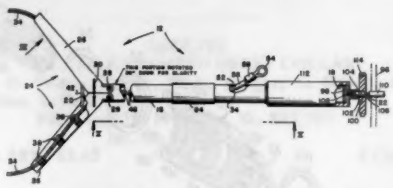
A bumper construction including a bumper and mounting means adapted to mount the bumper on the rear of a pickup truck for movement between retracted and rearwardly extending positions; the mounting means having means to releasably lock the bumper in one of its positions, and the bumper having a rearwardly extensible step and a hitch device removably mounted thereon to permit unobstructed access to the step when the latter is in its extended position.

3,588,161

RECOVERY SNARE

Jack L. Sayre, Glendora, and Robert E. Pace, Long Beach, Calif., assignors to the United States of America as represented by the Secretary of the Navy

Filed Feb. 5, 1969, Ser. No. 796,683
Int. Cl. B66c *1/12*
U.S. Cl. 294—19 **12 Claims**



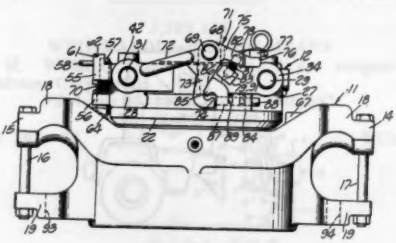
A recovery snare including a cable, and an elongated element, such as a tube, and a yoke at a snare end of the tube. The yoke may include a pair of hollow longitudinally slanted arms which are pivotally connected to the snare end of the tube. The cable is threaded through the tube and the hollow arms to form a loop at the snare end. The arms of the yoke are provided with means, such as snubbers, for releasably retaining the cable in the arms until such time the cable is looped around and drawn tight on an object to be retrieved.

3,588,162

ROTATING FLAPPER ELEVATOR

Taylor L. Jones, and John W. Turner, Jr., Houston, Tex., assignors to Byron Jackson, Inc., Long Beach, Calif.

Division of Ser. No. 693,627, Dec. 26, 1967, Pat. No. 3,495,864.
Filed July 22, 1969, Ser. No. 862,561
Int. Cl. E21b *19/00*
U.S. Cl. 294—86.29 **4 Claims**



A flapper-type elevator for oil well pipe and the like, provided with a rotatable flapper and flapper base assembly having releasable lock means operable to permit or prevent rotation, and provided with holes for receiving a canting means for canting the elevator to pick up horizontal pipe.

3,588,163

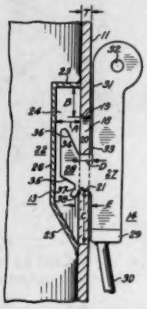
FURNACE COVER LIFTING MEANS

Herbert Wald, Baltimore, Md., assignor to Bethlehem Steel Corporation

Filed Mar. 25, 1969, Ser. No. 810,275
Int. Cl. B66c *1/00*
U.S. Cl. 294—67 **2 Claims**

Improved lifting apparatus for a heating furnace removable cover adapted to cooperate with a base and form with it a heating chamber through which a gaseous atmosphere is circulated. The lifting apparatus includes a pair of lifting pockets associated with the furnace cover peripheral sidewall. Each pocket has an aperture which extends through

the cover sidewall adjacent its top and a gastight enclosure which is secured to the cover sidewall around each aperture.

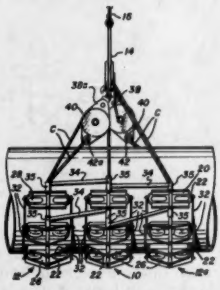


Hook devices adapted to be connected to a crane each have a hook which engages the upper periphery of a lifting pocket aperture.

3,588,164
PIPE HANDLING CRADLE

Melvin James Wheeler, 930 Crestview Drive, Farmington, N. Mex.

Filed Aug. 4, 1969, Ser. No. 847,158
Int. Cl. B66c *1/18*
U.S. Cl. 294—74 **9 Claims**



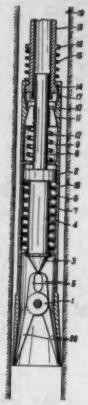
A cradle or sling for supporting pipe lines during their fabrication characterized by a plurality of longitudinally spaced cradle sections each formed of a plurality of roller supporting frames, the frames being link connected in such manner to permit them to conform to pipes of various diameters, the sections being link connected to permit them to conform to a longitudinal curve in the pipe and the sections being interconnected by a cable system to permit them to move relatively in a vertical direction.

3,588,165
FISHING DEVICE FOR DEEP WELLS

Georg Varga, Vienna, Austria, assignor to Osterreichische Mineralolverwaltung Aktiengesellshaft, Vienna, Austria

Filed Mar. 13, 1969, Ser. No. 807,010
Claims priority, application Austria, Mar. 19, 1968, A2721/68
Int. Cl. E21b *31/00;* **E21c** *19/00*
U.S. Cl. 294—86.3 **8 Claims**

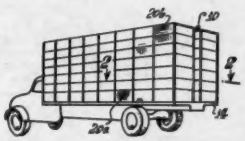
A fishing device for use in deep wells in which a fishing tool is arranged in the lower end of a tubular member and is adapted to be actuated by an axially movable piston in a cylinder connected to said tubular member when upon the fishing tool encountering a resistance in the well the piston is moved downwardly in the cylinder by the pressure of the drilling fluid supplied by a pipe length connected to the upper end of the cylinder after a piston slide value in the upper end of the cylinder has been closed to prevent the drilling fluid from being discharged into the drill hole. The fishing tool when actuated seizes the article to be removed from the well and a piston rod on the piston is locked in place so that the fishing tool may be raised to remove the seized article from the well.



3,588,166
MULTIPLE COMPARTMENT STRUCTURE FOR TRUCKS

Donald F. Day, 9213 Tamarind St., Fontana, Calif.

Filed May 21, 1969, Ser. No. 826,586
Int. Cl. B60p *3/04;* **B62d** *33/04*
U.S. Cl. 296—24 **13 Claims**



A structure that forms layers of compartments on a truck bed for transporting fowls comprises a plurality of upright rods, side and back compartment wall panels that telescopically engage the rods and vertically spaced floor panels that also telescopically engage the rods.

3,588,167
FRAME CONSTRUCTION FOR A TELESCOPIC TRAILER

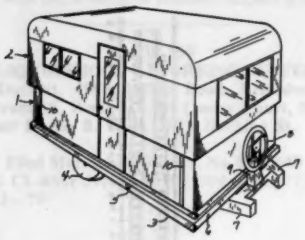
John W. Ratcliff, and Rudy J. Ratcliff, Marengo, Ill., assignors to Ratcliff Industries, inc., Marengo, Ill.

Filed Mar. 24, 1969, Ser. No. 809,699
Int. Cl. B60p *3/34*
U.S. Cl. 296—27 **5 Claims**

A frame construction for a telescopic trailer. The trailer includes a lower trailer section and an upper trailer section is mounted for telescopic movement between an upper dwelling position and a lower transporting position.

The lower trailer section includes a frame member and a vertical wall is supported on the frame member and spaced from both the inner and outer edges of the frame member. A floor extends across the lower trailer section and is supported on the inner edge portion of the frame member.

The upper trailer section includes a vertical wall and when the upper trailer section is in the transporting position, the



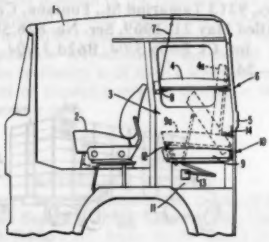
lower edge of the vertical wall of the upper trailer section is adapted to rest on the outer edge portion of the frame member.

3,588,168

SLEEPING PLACE ARRANGEMENT FOR TRUCKS

Hans Froitzheim; Karl Letzel, and Leo Bsirske, Sindelfingen, Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany

Filed Aug. 8, 1968, Ser. No. 751,292
Claims priority, application Germany, Aug. 8, 1967, D53788
Int. Cl. B62d *33/06*
U.S. Cl. 296—28 **17 Claims**



A sleeping place arrangement for trucks in which cushioned benches which are arranged to the rear of the driver seat and of the assistant driver seat, are preferably mounted at the rear boundary wall of the driver cab and serve as berths; the two benches, arranged one below the other, are pivotally secured along one side thereof at the driver cab with the aid of foldable double hinges and are supported at the opposite side thereof by securing means mounted at the driver cab and selectively holding the benches in the sleeping position or in a position in which the upper bench serves as backrest and the lower bench as seating surface for an additional seat bench.

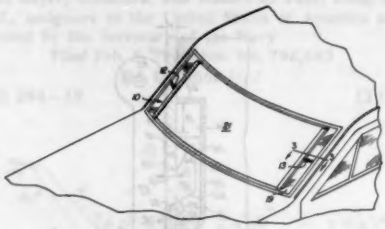
3,588,169

WINDSHIELD PROTECTOR

Judith Lee Lunt, Salt Lake City, Utah, assignor to C. Richard Barber, Salt Lake City, Utah and Charles S. Winn, Bountiful, Utah, a fractional part interest to each

Filed Dec. 20, 1968, Ser. No. 785,574
Int. Cl. B60j *1/20*
U.S. Cl. 296—95 **5 Claims**

A cover and anchors for use in protecting automobile windshields from ice, frost and snow accumulations. The anchors fit into a windshield molding to be secured in place



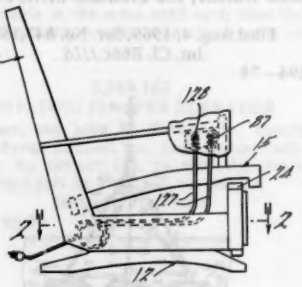
and the cover, which is connected by springs to the anchors, is adjustable to fit any conventional windshield.

3,588,170

MOTOR-OPERATED RECLINING CHAIR

Edward M. Knabusch, and Edwin J. Shoemaker, Monroe, Mich., assignors to La-Z-Boy Chair Company

Filed July 3, 1969, Ser. No. 839,031
Int. Cl. A47c *1/02*
U.S. Cl. 297—69 **10 Claims**



The chair has a base frame to which a chair frame is mounted for rearward tilting movement and on which a seat is supported for upward and forward movement as a pivoted back is moved rearwardly on the chair frame by a motor driven lead screw. The forward portion of the tiltable chair frame supports linkage for a leg rest which is operated by a second motor driven lead screw for swinging the leg rest forwardly of the seat and to retracted position. The motors are controlled by "off" switches the actuator of which can be moved in either direction for driving the motors clockwise or counterclockwise.

3,588,171

CYCLE SADDLE AND METHOD OF FORMING SAME

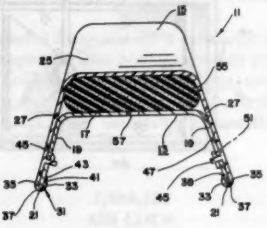
Maurice E. Rich, Jr., Memphis, Tenn., assignor to Troxel Manufacturing Company, Moscow, Tenn.

Continuation-in-part of application Ser. No. 740,602, June 27, 1968, now abandoned. This application Sept. 12, 1968, Ser. No. 766,665
Int. Cl. A47b *17/00*
U.S. Cl. 297—195 **7 Claims**

A cycle saddle is disclosed which includes a frame and a plastic integrally formed cover mounted on the frame. A foam cushion is provided between the top of the cover and the top of the frame. A beading is provided around the lower edge of the cover which defines an upwardly opening groove in which is received a lower edge of the depending skirt portions of the frame that seal the lower edge of the cover with the frame. Also is disclosed additional securing means in the form of lugs integrally formed on the cover and projecting through apertures or elongated slots in the frame with integrally formed heads on the inner ends of the lugs to hold

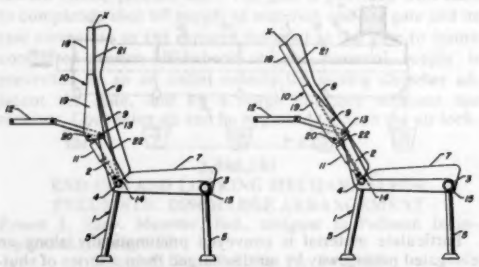
the cover in place. A method of producing the cycle saddle is disclosed which includes the steps of providing a frame with a hole and a plurality of apertures or elongated slots therethrough; providing a cover provided with a depending skirt having a plurality of plastic lugs and having beading around the lower edge thereof; placing the cover on the frame with the lugs extending through the apertures or slots and with the beading gripping the lower edge of the skirt portions of the frame; heating the ends of the lugs to provide heads to hold the cover in place; providing a space between the top of the cover and the frame; and injecting components of liquid material through the hole into the space between the frame and the cover, which components react and form the foam cushion.

A modified cycle saddle is also disclosed which includes a somewhat similar frame and a plastic cover which is formed by injection molding. However, this modified cycle saddle has the additional securing means in the form of a plurality of spaced tabs projecting inwardly and downwardly from the skirt portion of the frame for engaging the inner flange of the



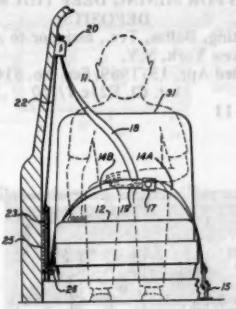
beading adjacent the distal edge thereof to anchor the inner flange to the depending skirt of the frame. In addition, the modified embodiment has the cushion means thereof bonded both to the cover and the frame to form a unitary saddle. A method of producing the modified saddle is disclosed which includes the steps of providing a frame with a plurality of spaced tabs projecting inwardly and downwardly from the skirt portion of the frame; providing a cover having a skirt with beading means on the lower edge thereof including an inner flange to provide an upwardly extending groove; placing the cover on the frame with the lower edge of the frame being received in the groove and with the tabs adjacent the inner flange, and with a space being provided between the tops of the frame and cover; bending the tabs downwardly against said inner flange to anchor the inner flange to the frame; and injecting components of liquid material into the space between the frame and the cover which components react to form a cushion and at the same time the cushion becomes bonded to the cover and to the frame to form a unitary saddle.

3,588,172
RECLINING SEAT
Eugene R. McGregor, Huntington Beach, Calif., assignor to Universal Oil Products Company, Des Plaines, Ill.
Filed Mar. 12, 1969, Ser. No. 806,394
Int. Cl. A47c *1/024*
U.S. Cl. 297—355 **4 Claims**



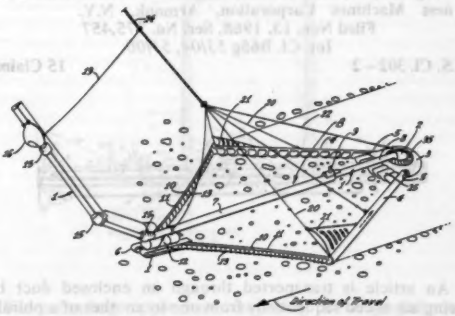
A reclining seat having a high back pivot and an upper back portion which is inclined forward when the back is in an upright position and which straightens into linear alignment with a lower back portion when the seat back is reclined.

3,588,173
MOMENTUM-ACTUATED HARNESS
Edward W. Apri, 998 Lehigh St., Altadena, Calif.
Filed Jan. 9, 1969, Ser. No. 790,128
Int. Cl. A62b *35/60*
U.S. Cl. 297—386 **10 Claims**



The harness apparatus discriminates between moderately accelerated and rapidly accelerated displacement of the harness with respect to a belt-traverse control by means of a relationship between a sensing roller with pivot points free to move in one direction and a parallel friction bar or surface. The sensing roller is springloaded away from the friction bar. Latches are commonly biased to bear against axle ends of the sensing roller. The harness belt path is from a resilient anchor, between the friction bar and the sensing roller, and around the roller to an anchored harness component. Under moderate belt acceleration the roller rotates freely, held in axial place by the balance between the latches and the roller spring load. Rapid belt acceleration overcomes the roller spring load and belt motion pulls the roller into proximity with the friction bar, binding the harness belt between them. The latches lock the roller against withdrawal.

3,588,174
COLLECTOR ASSEMBLY FOR DEEP SEA MINING
Andre M. Rossfelder, La Jolla, and Bertram J. Thorn, Arcadia, Calif., assignors to Tetra Tech, Inc., Pasadena, Calif.
Filed Aug. 1, 1969, Ser. No. 846,876
Int. Cl. E02f *7/00*
U.S. Cl. 299—8 **14 Claims**



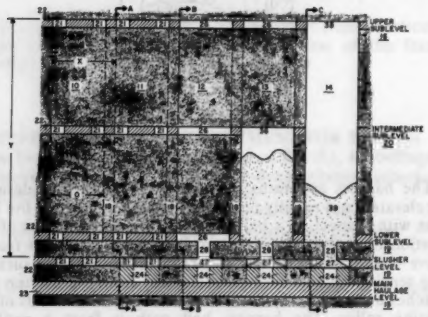
A collector assembly is provided which may be towed on the ocean floor for mining loose aggregate, the aggregates being lifted to the surface by means of a water stream which flows upwardly from the collector. The collector to be

described is foldable, and it is fully deployed only when immersed and ready for operation. Hydraulic means is provided for gathering and conveying the nodules toward the intake to the aforesaid water stream. Ground traction of the collector is provided by means, for example, of a combined tow from a riser and from a follower pendant which is rigged on the collector through sidelines similar to those used in the fishing gear art.

3,588,175
METHODS FOR MINING DEEP THICK OIL SHALE DEPOSITS

Jerry M. Whiting, Dallas, Tex., assignor to Atlantic Richfield Company, New York, N.Y.

Filed Apr. 15, 1969, Ser. No. 816,249
Int. Cl. E21c *41/10*
U.S. Cl. 299—11 **3 Claims**

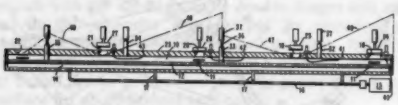


Mining deep subsurface deposits of oil shale and associated minerals by blasthole stopping. A main haulage level is driven beneath a horizontal series of production blocks and subordinate levels are driven between the vertical limits of the blocks. Outlets for broken ore are created at the bottom of the blocks extending to the main haulage level. The blocks are sequentially drilled and blasted to form a series of stopes in progressive stages of development separated by thin pillars. The broken ore is recovered from the stopes via the main haulage level and the empty stopes are backfilled.

3,588,176
ARTICLE TRANSPORT SYSTEM AND METHOD

Thomas M. Byrne, Wappingers Falls, and Arkady Leoff, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 13, 1968, Ser. No. 775,457
Int. Cl. B65g *53/04, 53/00*
U.S. Cl. 302—2 **15 Claims**

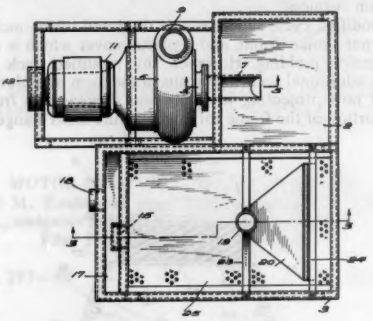


An article is transported through an enclosed duct by being advanced sequentially from one to another of a plurality of stations. The article is suspended within the duct by an air film in the duct. The article is advanced from one station to the next adjacent station by producing a pressure differential between the two stations. To prevent overtravel of the article beyond the next adjacent station to which it is advanced, a vacuum brake may be utilized adjacent each of the stations.

3,588,177
FOOD PUMP

Gus M. Ellis, Jr., and William J. McCoy, Jr., Knoxville, Tenn., assignors to W. J. Savage Company, Inc., Knoxville, Tenn.

Filed Oct. 31, 1968, Ser. No. 772,292
Int. Cl. B65g *53/30*
U.S. Cl. 302—14 **9 Claims**

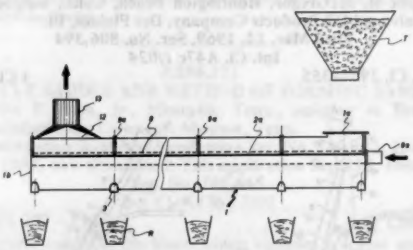


A food pump for conveying vegetables, fruits and other wettable materials in a waterline from a point of accumulation to a remote point. The conveyed material is dewatered and the water is returned for reuse. A special return water screen removes particles, such as hulls and debris, from the flow of water. In the event of power failure, loss of prime or backwash, this screen would also serve to hold the vegetables or food in the tank.

3,588,178
APPARATUS FOR CONVEYING AND DISTRIBUTING PARTICULATE MATERIAL

Jean Fulchiron, Metz-Borny, France, assignor to Institut de Recherches De La Siderurgie Francaise, Saint Germain-en-Laye, (Yvelines), France

Filed Aug. 27, 1968, Ser. No. 755,587
Claims priority, application France, Sept. 6, 1968, 120148
Int. Cl. B65g *53/04*
U.S. Cl. 302—28 **3 Claims**



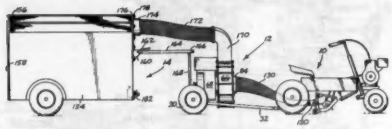
Particulate material is conveyed pneumatically along an elongated passageway by air discharged from a series of shutters in an air conduit arranged inside the passageway and directed away from the entry port. A plurality of discharge orifices in the bottom of the passageway distribute the conveyed material to receptacles placed therebelow.

3,588,179

POWER MOWER CLIPPING-COLLECTING ATTACHMENT-COLLECTING TRAILER THEREFOR

Oscar D. Gifford, 1003 N. Central, Olympia, Wash.

Division of Ser. No. 425,870, Jan. 15, 1965, Pat. No. 3,367,092. Continuation of application Ser. No. 324,977, Nov. 20, 1963. Filed Jan. 17, 1968, Ser. No. 723,962
Int. Cl. B65g 53/40
U.S. Cl. 302—37 3 Claims



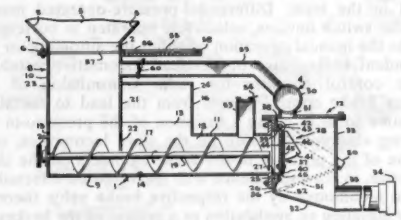
A flexible conduit interconnects a blower on a lawn mower and a grass-clippings trailer body connected pivotally to the mower. The conduit also is connectable selectively to a second opening in the lower portion of the trailer body having an air passage plow associated therewith to facilitate discharge of the clippings from the body.

3,588,180

AIR LOCK

Joseph S. Herr, P.O. Box 1416, Wickenburg, Ariz.

Filed Aug. 11, 1969, Ser. No. 849,108
Int. Cl. B65g 53/40
U.S. Cl. 302—50 8 Claims



Air lock for introducing material into an air conveying line while preventing blowback to a material supply container. Material moves into a receiver and is carried to a mixing chamber for entrainment by an airstream. A swinging gate, sealed except at the bottom, controls flow of material into the mixing chamber, and the entraining air enters the chamber and flows across the back of the gate, urging the gate toward closed position. The gate is mechanically urged toward closed position also. The gate is provided with seals to completely shut off supply of material, and the gate and its seat cooperate to cut through material at the gate to insure complete closure. Blowback to the material supply is prevented by an air outlet outside the mixing chamber adjacent the gate, and by a surge chamber adjacent the receiver. Conveying air can be bypassed to clean the air lock.

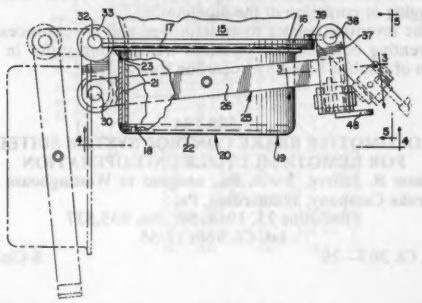
3,588,181

END CAP AND LOCKING MECHANISM FOR PNEUMATIC DISCHARGE ARRANGEMENT

Ernest J. Nagy, Munster, Ind., assignor to Pullman Incorporated, Chicago, Ill.

Filed July 30, 1969, Ser. No. 846,106
Int. Cl. B65g 53/40
U.S. Cl. 302—52 6 Claims

A pneumatic discharge outlet for the hopper of a railway car comprises a cup-shaped cap adapted to fit over the end of a pneumatic tube for closing the same. A bail-shaped member is hingedly connected adjacent the end of the pneumatic tube and has pivotally connected thereto the cap which in the closed position is in sealing engagement with a gasket supported on a flange connected to the pneumatic tube adjacent one end thereof. A locking arrangement is pivotally connected to the flange of the pneumatic tube and is adapted



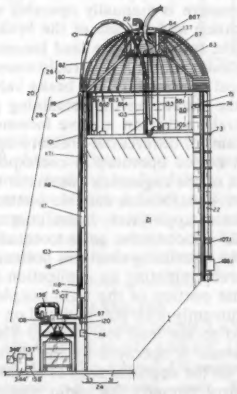
to engage end portions of the bail-shaped member to lock the same in the closed position and also to exert a pressure on the cap which will compress the gasket to provide for effective sealing between the cap and the end of the pneumatic tube. The locking mechanism includes a manually actuated camming element operable to exert pressure for effectively sealing the cap relative to the end of the pneumatic tube.

3,588,182

SILO UNLOADER APPARATUS AND PROCESS

James Burl Johnson, Jr., Lubbock; Malcolm Perry Hammond, Plainview, and Billy Wayne Starnes, Lubbock, Tex., assignors to Gifford-Hill-Western, Inc., Lubbock, Tex.

Filed June 25, 1968, Ser. No. 739,848
Int. Cl. B65g 53/24
U.S. Cl. 302—56 4 Claims



Silo-unloading apparatus comprising a silage-gathering means; an operatively connected set of airtight vertical telescoping rigid conduit members, one interior and one exterior of the silo; with an air-moving and a solid-gas-separating means operatively connected to the outlet of the exterior conduit means to provide for a continually smooth and readily restarted discharge of silage therefrom and the process of operation thereof.

3,588,183

SULFUR-HYDROCARBON SLURRY PIPELINE TRANSPORTATION

Mary Frances Vondrak, Houston, Tex., assignor to Shell Oil Company, New York, N.Y.

Filed Oct. 30, 1968, Ser. No. 772,011
Int. Cl. B65g *53/04*
U.S. Cl. 302—66 8 Claims

An improved method of transporting sulfur-liquid hydrocarbon slurries through pipelines without causing plugging or corrosion of the pipelines.

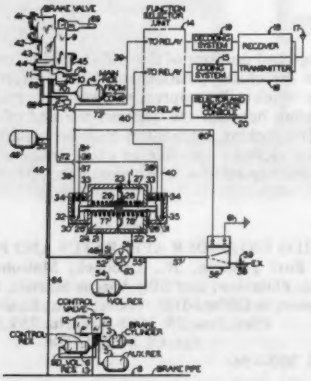
The invention relates to an improved and novel process of preventing corrosion of pipelines transporting sulfur in the form of a sulfur-liquid hydrocarbon slurry.

3,588,184

LOCOMOTIVE BRAKE CONTROL SYSTEM SUITED FOR REMOTE MULTIPLE UNIT OPERATION

William B. Jeffrey, Irwin, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed June 23, 1969, Ser. No. 835,537
Int. Cl. B60t *13/68*
U.S. Cl. 303—20 8 Claims



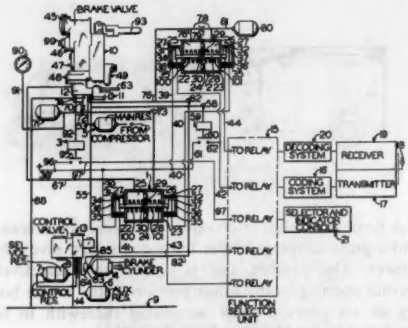
Brake control apparatus for the lead locomotive of a multiple unit locomotive control system wherein the brake valve on the lead locomotive is manually operable conventionally to control application and release of the brakes on the forward portion of the train from the lead locomotive and also to effect corresponding control (via radio-transmitted signals initiated by manual operation of the brake valve on the lead locomotive) of the brakes on the remaining portion of the train from the brake valve on a slave locomotive remotely located in the train. A differential-pressure-operated master controller switch device operated in correspondence to the manual operation of the engineer's automatic brake valve on the lead locomotive establishes suitable control circuitry for radio transmission of appropriate brake control signals from the lead to the slave locomotive so as to cause a variation of the pressure in the equalizing reservoir pressure on the slave locomotive, whereby initiating an application or a release of the brakes on that portion of the train coupled to the slave locomotive concurrently with that initiated on that portion of the train coupled to the lead locomotive. This master controller switch device is operated by the difference in fluid pressure present on the opposite sides of a movable abutment to not only control circuitry for radio transmission of appropriate brake control signals from the lead locomotive but also to control circuitry to a solenoid-operated valve which is operative to release fluid under pressure from one side of the abutment to atmosphere at a controlled or restricted rate independently of the release of fluid under pressure from the opposite side of this abutment to atmosphere at a faster rate simultaneously with the release of fluid under pressure from an equalizing reservoir on the lead locomotive in response to manual operation of the automatic brake valve on this locomotive.

3,588,185

LOCOMOTIVE BRAKE CONTROL APPARATUS SUITED FOR REMOTE MULTIPLE UNIT OPERATION

John G. Cannon, Allegheny, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed June 19, 1969, Ser. No. 834,835
Int. Cl. B60t *13/68*
U.S. Cl. 303—20 13 Claims



Brake control apparatus for the lead locomotive of a multiple unit locomotive control system wherein the brake valve on the lead locomotive is manually operable conventionally to control application and release of the brakes on the forward portion of the train from the lead locomotive and also to effect corresponding control (via radio-transmitted signals initiated by manual operation of the brake valve on the lead locomotive) of the brakes on the remaining portion of the train from the brake valve on a slave locomotive remotely located in the train. Differential-pressure-operated master controller switch devices, selectively operated in correspondence to the manual operation of either the automatic or the independent brake valve on the lead locomotive, establish suitable control circuitry for radio transmission of appropriate brake control signals from the lead to the slave locomotive so as to cause a variation of the pressure in the equalizing reservoir pressure on the slave locomotive, or a variation of the pressure in the brake cylinders on the slave locomotive, in correspondence with the variation effected on the lead locomotive by the respective brake valve thereon, thereby initiating an application or a release of the brakes on that portion of the train coupled to the slave locomotive concurrently with that initiated on that portion of the train coupled to the lead locomotive, or to cause independent application and release of the brakes on the slave locomotive substantially simultaneously with that on the lead locomotive.

3,588,186

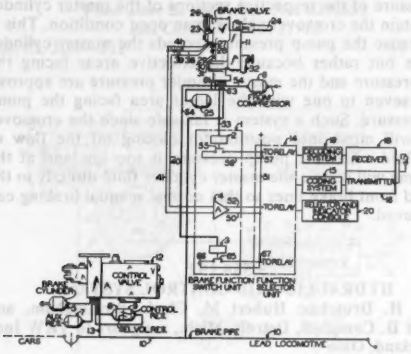
LOCOMOTIVE BRAKE CONTROL APPARATUS SUITED FOR REMOTE MULTIPLE UNIT OPERATION

Robert J. Worbois, Irwin, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed July 22, 1969, Ser. No. 843,515
Int. Cl. B60t *13/70*
U.S. Cl. 303—20 7 Claims

Brake control apparatus for the lead locomotive of a multiple unit locomotive control system wherein the brake valve on the lead locomotive is manually operable conventionally to control application and release of the brakes on the forward portion of the train from the lead locomotive and also to effect corresponding control (via radio-transmitted signals initiated by manual operation of the brake valve on the lead locomotive) of the brakes on the remaining portion of the train from the brake valve on a slave locomotive remotely located in the train. Switch devices selectively operated in correspondence to the operation of the brake valve on the lead locomotive establish suitable control circuitry for radio transmission of appropriate brake control signals from the lead to the slave locomotive. A pressure sensitive transistor responsive to pressure of fluid released from the equalizing reservoir on the lead locomotive effects operation of one of

said switch devices to cause the brake valve on the slave locomotive to operate to reduce the pressure in the corresponding equalizing reservoir so long as equalizing reservoir pressure is reduced on the lead locomotive.



3,588,187

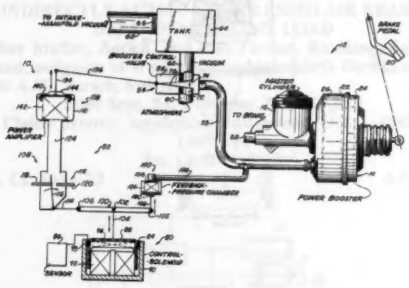
ANTISKID SYSTEM

Robert S. Mueller, Southfield, Mich., assignor to Eaton Yale & Towne Inc., Cleveland, Ohio

Filed Apr. 2, 1968, Ser. No. 723,345

Int. Cl. B60t *8/08*

U.S. Cl. 303—21 **31 Claims**



Disclosed herein is an antiskid system for reducing the pressure applied to the brakes of a vehicle upon slipping of the wheels of the vehicle relative to a support surface. The antiskid system includes an assembly for producing a signal the magnitude of which is proportional to a function of the rotational speed of at least one wheel of the vehicle compared to the speed of the vehicle and a control assembly for reducing the pressure applied to the brakes by an amount which is proportional to the magnitude of the signal. A feedback assembly is included in the control assembly to enable the pressure applied to the brakes to be initially reduced at a relatively high rate for rapid response.

3,588,188

CONTROL MEANS FOR BRAKING DEVICES

Charles F. B. Shattock, London, England, assignor to Westinghouse Brake and Signal Company, Limited, London, England

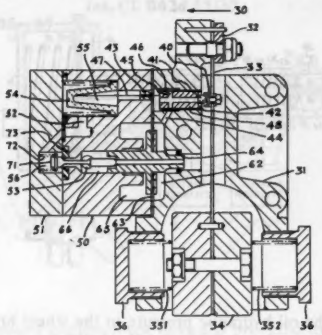
Filed Jan. 13, 1969, Ser. No. 790,824

Claims priority, application Great Britain, Jan. 19, 1968, 02929/68

Int. Cl. B60t *8/14, 15/00*

U.S. Cl. 303—21 **11 Claims**

An acceleration-sensing device in which a control valve has a restricted fluid inlet port, an outlet port and an exhaust port, the latter including a throttling element, the opening of which is dependent upon movement of a pendulum to which it is operatively connected, movement of the pendulum occurring upon acceleration or deceleration. A relay device including a pressure responsive member is located between the inlet/exhaust ports and the outlet port, a change in the throttling opening resulting in movement of this pressure-responsive member to vary the pressure at the outlet port.



3,588,189

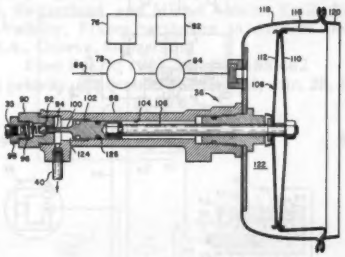
BRAKE CONTROL SYSTEM

James C. Cumming, Pleasant Ridge, Mich., assignor to North American Rockwell Corporation, Pittsburgh, Pa.

Filed June 5, 1969, Ser. No. 830,620

Int. Cl. B60t *8/16, 13/68*

U.S. Cl. 303—21F **1 Claim**



A brake control system for a vehicle which permits normal operation of all of the brakes under moderate braking loads, and, under heavier braking loads, detects minor and major tendencies of certain wheels to lock and constantly modulates the braking effort to maintain a condition of partial wheel slip while preventing wheel lock. The invention has particular application to a hydraulic brake system.

3,588,190

OIL HYDRAULIC PRESSURE MODULATING DEVICE FOR USE IN AN ANTISKID MEANS OF AUTOMOBILES

Yoshiaki Nakano, Gifu-shi; Atutosi Okamoto, Toyohashi-shi; Koichi Taniguchi, Kariya-shi, and Koichi Toyama, Toyohashi-shi, Japan, assignors to Nippon Denso Company Limited, Kariya-shi, Japan

Filed Feb. 10, 1969, Ser. No. 797,925

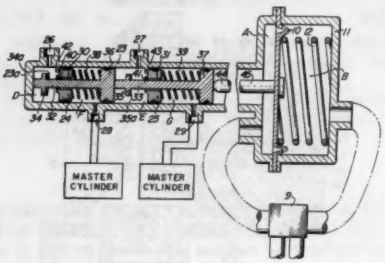
Claims priority, application Japan, June 29, 1968, July 30, 1968, July 16, 1968, 43/45291;43/53738;43/50092

Int. Cl. B60t *8/12*

U.S. Cl. 303—21 **4 Claims**

Here is disclosed an oil hydraulic pressure modulating device for use in an antiskid means of automobiles equipped with multisystem oil hydraulic braking means, wherein the

device is substantially formed of a hydraulic cylinder including therein a series of ports and cooperating piston and valve means constituting a series of tandem units each being adapted to intercept oil hydraulic communication between a master cylinder and a wheel brake cylinder or cylinders and

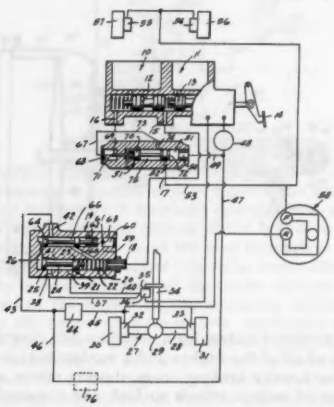


to lower the oil hydraulic pressure in the wheel brake cylinders for the purpose of relaxing the braking action to avoid skidding when the angular deceleration of the wheels has exceeded a safe limit due to abrupt stamping of the brake pedal when the automobile is running on a slippery road.

3,588,191
FOUR WHEEL SKID CONTROL SYSTEM

Rupert L. Atkin, Grosse Pointe Woods, and Gilbert H. Drutchas, Birmingham, Mich., assignors to TRW Inc., Cleveland, Ohio

Filed May 7, 1969, Ser. No. 822,439
Int. Cl. B60t *8/06, 8/26, 11/12*
U.S. Cl. 303—21 **10 Claims**

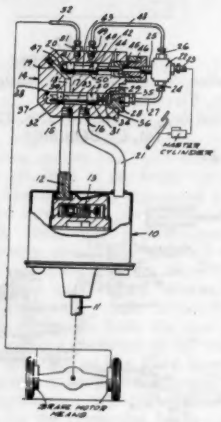


A four wheel hydraulic skid control valving system including a pump for developing a fluid pressure which is proportional to the speed of at least one of the vehicle wheels and means for coupling the fluid pressure from the pump directly to both the rear wheel cylinders and the front wheel cylinders of a four wheel braking system. Fluid pressure from the pump is normally bypassed through a pump return and accordingly does not build up sufficient pressure to actuate the wheel brake cylinders. However, when braking is desired, the operator depresses the braking pedal and fluid pressure from the rear master cylinder is applied to a spool valve which in turn moves in such a way as to throttle the flow of fluid to the pump return thereby increasing the fluid pressure in the system to a point sufficient to actuate the respective wheel cylinders. A crossover valve is provided in both the rear braking and the front braking portions of the system. The crossover valves are normally biased by fluid pressure from the respective sections of the master cylinder to close off the flow of fluid from the pump to the wheel brakes. However, when the pump pressure is sufficiently high as is the case when the vehicle is in motion, the pump pressure overcomes the pressure of the respective sections of the master cylinder to maintain the crossover valves in an open condition. This is not because the pump pressure exceeds the master cylinder pressure but rather because the effective areas facing the pump pressure and the master cylinder pressure are approximately seven to one with the larger area facing the pump fluid pressure. Such a system is fail-safe since the crossover valves will move into position for closing off the flow of pump fluid when the pump pressure is too low and at the same time will couple the master cylinder fluid directly to the rear and front brake lines so that normal manual braking can be achieved.

3,588,192
HYDRAULIC SKID CONTROL SYSTEM

Gilbert H. Drutchas; Hubert M. Clark, Birmingham, and David D. Campbell, Detroit, Mich., assignors to TRW Inc., Cleveland, Ohio

Filed June 2, 1969, Ser. No. 829,325
Int. Cl. B60t *8/06, 13/16*
U.S. Cl. 303—21F **9 Claims**



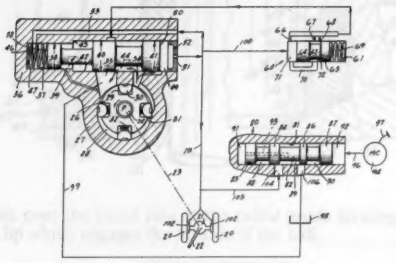
A hydraulic skid control valving circuit having a hydraulic pump driven in proportion to the speed of a vehicle wheel and developing a fluid pressure in response thereto. A pump return is provided, and all of the pump output is coupled to the pump return when braking action is not desired. A spool valve is provided, and output pressure from the master cylinder is used to actuate the spool valve into a throttling action with the pump return. When the pump return is throttled, the pump output increases, and this pressure is sufficient to be utilized as the principal braking force. A second spool valve is provided to normally cut off the pump output from the brake motor means. However, when the throttling of the pump return occurs, the pump output increases sufficiently to move the spool valve into a position which allows the pump output to be connected directly to the brake motor means. The system is fail-safe since in the absence of pump pressure the second spool valve moves into a position for coupling the output of the master cylinder directly to the rear brake motor means. When the pump pressure is coupled directly to the motor means a closed hydraulic mechanical circuit is provided wherein the rate of rotation of the vehicle wheels generates a pressure signal at the pump output which may be said to be the sensor signal. This sensor signal is also the signal which is used to apply the brakes. As the wheels begin to decelerate due to the braking action, the pump pressure reduces, and as wheel lock occurs, the pump pressure reduces to the point where the brakes are then released.

3,588,193

HYDRAULIC ANTISKID SYSTEM

Gilbert H. Drutchas, Birmingham, Mich., assignor to TRW Inc., Cleveland, Ohio

Filed June 2, 1969, Ser. No. 829,551
Int. Cl. B60t 8/06, 11/12
U.S. Cl. 303—21F 10 Claims



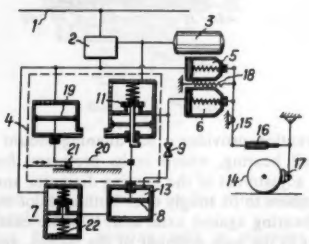
An hydraulic skid control wherein hydraulic braking means apply a decel bias to the wheels of a vehicle and a wheel-driven pump generates a wheel-feed hydraulic input. Control means suppress the decel bias with a controlled percent of wheel slippage and include a differential flow-responsive bypass valve for reducing the hydraulic input as a function of flow and a variable orifice pressure-compensating valve for metering out the hydraulic input as a function of pressure.

3,588,194

INDIRECTLY ACTING COMPRESSED AIR BRAKE DEPENDENT ON THE LOAD

Walter Muller, Zurich, and Pius Fischer, Rumlang, Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle A.G., Zurich, Switzerland

Filed Sept. 23, 1969, Ser. No. 860,233
Claims priority, application Switzerland, Oct. 1, 1968, 14692/68
Int. Cl. B60t 8/18
U.S. Cl. 303—23 4 Claims



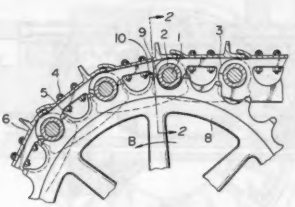
An indirectly acting compressed air brake dependent on the load having an empty brake cylinder for the braking of an empty vehicle and a load brake cylinder which acts on the same brake-rod linkage connected to a pressure transmitter which is controlled in dependence upon the service load and the pressure in the empty brake cylinder. A filling device controlled by a brake pressure limiting valve is provided for the load brake cylinder. The filling device produces, upon the starting of the brake in the load brake cylinder even in the case of an empty or only partly loaded vehicle, an initial or admission pressure, dependent upon the brake pressure limiting valve to overcome restoring spring forces. The filling device has a piston capable of being acted on by compressed air from the brake pressure limiting valve operatively connected to an inlet valve of the pressure transmitter. It also has a double nonreturn check valve, by which the load brake cylinder can be acted upon by compressed air both from the brake pressure limiting valve and from the pressure transmitter.

3,588,195

TRACK BUSHING WEAR REDUCING DEVICE

Teruo Furukawa, Sagamihara-shi, Japan, assignor to Caterpillar Mitsubishi Ltd., Tokyo, Japan

Filed Dec. 31, 1968, Ser. No. 788,241
Claims priority, application Japan, Jan. 9, 1968, 43/665
Int. Cl. B62d 55/20
U.S. Cl. 305—57 1 Claim



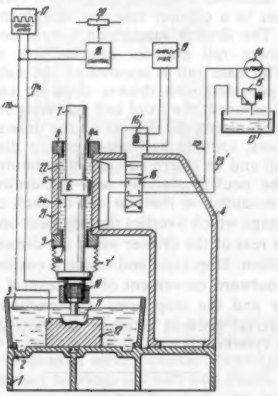
An improved endless track device is provided for preventing an early wear of track bushes and sprockets, which device is characterized in that projections are provided at inside ends of track links and notched portions are also provided at both ends of tooth tips of sprockets; and that in a locality where the track links and sprockets come into engagement with each other at the time of driving the track in a reverse direction, these projections are engaged with the notched portions only immediately before said engagement to thereby prevent contact between peripheral surface of the bush and the tooth surface of the sprocket.

3,588,196

ELECTRODE LINEAR FEED AND GUIDING MECHANISM FOR ELECTROEROSION MACHINING APPARATUS

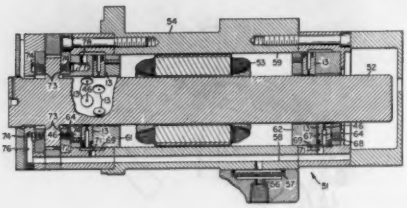
Benno Ibo Bonga, Onex-Geneva; Hans Rudolf Lehmann, Satigny, Switzerland, and Michel Antoine Emile Vuichard, Jurens-Valleiry, France, assignors to Ateliers Des Charmilles S.A., Geneva, Switzerland

Filed Dec. 6, 1967, Ser. No. 688,462
Claims priority, application Switzerland, Apr. 28, 1967, 6156/67
Int. Cl. F16c 1/24; F01b 3/10
U.S. Cl. 308—5 8 Claims



A hydraulic servomechanism for feeding an electrode toolholder in electroerosion machining apparatus and the like, having self-centering hydrostatic bearings for supporting the electrode toolholder.

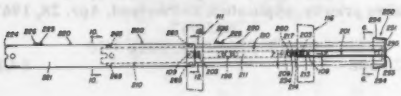
3,588,197
FLUID LUBRICATED BEARING
Charles D. Barnett, Woodside, Calif., assignor to Ampex Corporation, Redwood City, Calif.
Filed Sept. 30, 1968, Ser. No. 763,801
Int. Cl. F16c 17/16
U.S. Cl. 308—9 3 Claims



Forces causing self-acting fluid bearing whirl in a journal bearing are reduced by means of a double row of staggered pad members arranged in circumferentially spaced relation within the bearing, so as to limit the self-acting pressure wedge; and the necessary bearing fluid is provided from a pressurized source with orifices in the center of each pad. The pads are formed as cylinders that can be radially repositioned to compensate for wear.

The invention herein described was made in the course of or under a contract or subcontract thereunder with the U.S. Department of Defense.

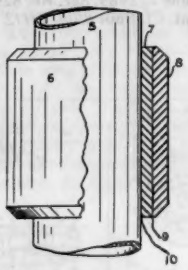
3,588,198
SUSPENSION SYSTEM FOR FILING CABINET
Edward C. Stewart, and Florian A. Walter, Aurora, Ill., assignors to Lyon Metal Products, Incorporated, Aurora, Ill.
Filed Aug. 15, 1969, Ser. No. 850,590
Int. Cl. F16c 21/00
U.S. Cl. 308—3.8 11 Claims



There is disclosed a drawer suspension system for mounting a drawer in a cabinet case for movement inwardly and outwardly. The drawer suspension system comprises a case rail, a drawer rail and an intermediate rail or neutral member. The case rail is secured to the cabinet case. The drawer is provided with drawer clips on each side of the drawer and adjacent the front and rear ends of the drawer for detachably mounting the drawer on the drawer rail. Antifriction members, such as ball bearings, are disposed between the case rail and an intermediate rail or neutral member and between the neutral member and the drawer rail. A lock bracket is mounted on the rear end of each case rail and includes a flange which overlies the adjacent one of the drawer clips at the rear of the drawer when the drawer is in the fully closed position. Stop arms and resilient cushions limit the inward and outward movement of the several rails relative to each other and the stop arms, the resilient cushions and buffer material prevent damage to various parts of the suspension system.

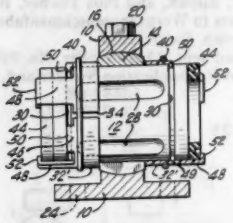
3,588,199
DRILL PIPE PROTECTOR
Arthur H. Hopmans, 1753 N. Dillon St., Los Angeles, Calif.
Filed Aug. 11, 1969, Ser. No. 848,857
Int. Cl. F16c 1/26
U.S. Cl. 308—4A 5 Claims

My invention is a drill pipe protector comprising a spacing means and an attaching means and characterized by a means



for inducing a compressive stress at the wearing surface to close and seal cuts.

3,588,200
SELF-ALIGNING MOUNT FOR LINEAR MOTION BALL BEARINGS
John B. Thomson, Manhasset, N.Y., assignor to Thomson Industries, Inc., Manhasset, N.Y.
Filed Sept. 26, 1968, Ser. No. 762,726
Int. Cl. F16c 29/06
U.S. Cl. 308—6R 10 Claims



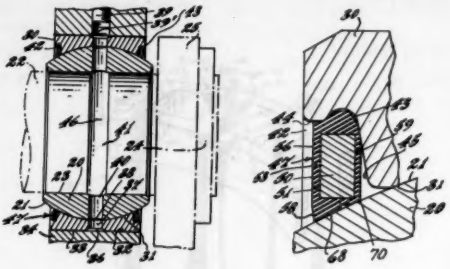
The invention provides a self-aligning mount for a linear motion ball bearing, which in its preferred form provides diametral adjustment of the bearing diameter and flexible tubular members to fit snugly over both ends of the bearing to hold the bearing against axial and, in some cases, rotational movement in the base member of the mount, and which also provides a holding means for securing bearing seals at either end of the bearing.

3,588,201
SEALED SELF-ALIGNING PLAIN BEARING
Heinrich K. Schmidt, Levittown, Pa., assignor to Roller Bearing Company of America, Trenton, N.J.
Continuation-in-part of application Ser. No. 712,355, Mar. 12, 1968. This application Sept. 5, 1969, Ser. No. 855,627
Int. Cl. F16c 1/24
U.S. Cl. 308—36.1 3 Claims

The subject matter of the invention is a self-aligning plain bearing which has inwardly directed annular grooves at the ends of the socket opposite the ball, and which retains within the grooves composite sealing rings consisting of a metal ring and a ring of elastomeric rubber or synthetic rubber, which is bonded to the metal ring.

The invention applies particularly to a socket which has only one axial fracture in its circumference. The rubber ex-

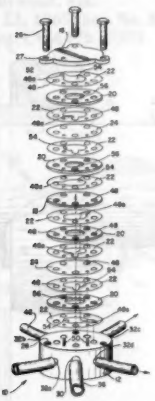
tends over the metal ring at the radial outside and holds it in an inwardly directed annular groove of the socket and extends over the metal ring at the radial inside forming a sealing lip which engages the outside of the ball.



3,588,202
AUTOMATIC FLUID CONTROL DEVICE

Kenneth C. Johnson, 154 Promenade St., West Barrington, R.I.

Filed Oct. 10, 1968, Ser. No. 766,454
Int. Cl. G05d *16/06;* **F16c** *32/00*
U.S. Cl. 308 **10 Claims**



An automatic fluid control device for controlling fluid flow through a plurality of ports.

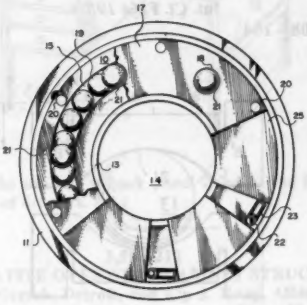
The device has a housing with a plurality of fluid passageways therein, a plurality of chambers formed within said housing, a flexible diaphragm separating said chambers, an inlet port in communication with said chambers via said passageways, and a plurality of outlet ports in communication with selective ones of said chambers via said passageways.

3,588,203
SELF-EQUALIZING, SELF-ALIGNING THRUST BEARING

Joseph W. Purman, Milwaukee, Wis., assignor to The Louis Allis Company

Filed Sept. 12, 1969, Ser. No. 857,349
Int. Cl. F16c *17/06*
U.S. Cl. 308—160 **10 Claims**

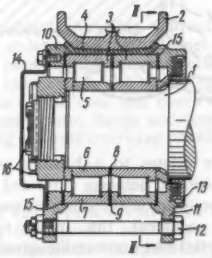
A thrust bearing in which two sets of balls, one set free to move in an annular race and a second set supported by the first set and acting as pivots for the bearing pads, act in consort to transmit and balance movement of the pads. The bearing is improved by the use of a retaining ring to keep the first set of balls within the race thereby permitting several balls of the first set to lie between consecutive balls of the second set. The ring has holes therein to locate the balls of the second set. The bearing is further improved by the use of offset ring holes or offset pad spacers to provide offcenter pivoting of the pads.



3,588,204
AXLE-BOX FOR AXLE OF PAIR OF WHEELS OF TRACK ROLLING STOCK

Valentin Vasilievich Abashkin, Moskovskaya Oblast, Podolsky raion, poselok Scherbinka, Sadovaya Ulitsa, 4, Kv. 17, Moskovskaya Oblast, and Petr Ivanovich Travin, Ulitsa Markhlevskogo, 20/2, Kv. 47, Moscow, U.S.S.R.

Filed Oct. 17, 1968, Ser. No. 768,322
Int. Cl. F16c *19/04*
U.S. Cl. 308—184 **1 Claim**



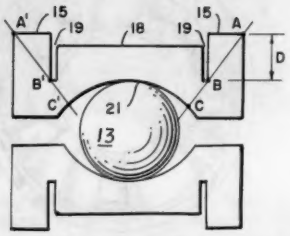
An axle-box for the axle of a pair of wheels of track rolling stock comprises a body which is open from below and which receives a pair of coaxial rolling contact bearings. Between the body and contact bearings is a half ring elastic gasket enveloping both contact bearings. The half ring has opposite edges which are inclined outwardly to embrace the body and resist axial load. Concentric spacer rings of elastic material are mounted between inner and outer rings of the bearings and the spacer rings and gasket provide for self-adjustment of the roller contact bearings when the axle journal is deformed under external load.

3,588,205

ROLLING CONTACT BEARING DESIGN WHICH REDUCES BEARING GENERATED NOISE AND FRETTING CORROSION

Thomas L. Daugherty, Arnold, and Gerald J. Philips, Annapolis, Md., assignors to The United States of America as represented by the Secretary of Navy

Filed Aug. 27, 1969, Ser. No. 853,449
Int. Cl. F16c 19/04
U.S. Cl. 308—184 6 Claims



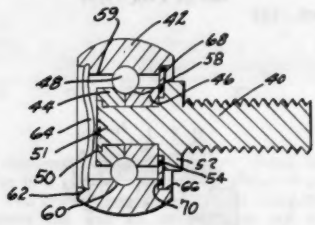
A bearing having a relief in the outer exterior cylindrical surface circumferentially around the race in the area beneath the rolling element supporting area of the raceway, and having two circumferential grooves which lie on either side of the relieved portion in the race of the bearing.

3,588,206

BEARING CONSTRUCTION

Ruben E. Frost, Grand Rapids, Mich., assignor to C. L. Frost & Son, Inc., Grand Rapids, Mich.

Filed Nov. 5, 1968, Ser. No. 773,474
Int. Cl. F16c 33/78
U.S. Cl. 308—187.1 7 Claims



This disclosure relates to a bearing assembly. Bearing members are positioned between outer and inner race members. An axial shoulder on the outer raceway portion and a groove formed adjacent the inner raceway member cooperate with a flexible, nonmetallic annular sealing ring to seal the bearing from dirt and to retain lubrication within the bearing. The sealing ring preferably fits loosely in the groove to minimize friction and wear.

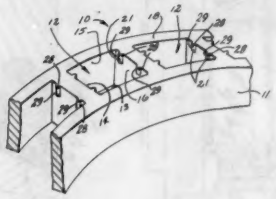
3,588,207

ROLLING ELEMENT RETAINER HAVING ELEMENT RETAINING TABS

Daniel F. Greby, Buena Park, Calif., assignor to Industrial Tectonics, Inc., Ann Arbor, Mich.

Continuation of application Ser. No. 616,667, Feb. 16, 1967, now abandoned. This application Jan. 15, 1970, Ser. No. 4,168
Int. Cl. F16c 19/20
U.S. Cl. 308—201 4 Claims

A one-piece solid ring having circumferentially spaced pockets which have planar sides, each pocket having its circumferentially facing sides spaced-apart substantially a distance equal to the diameter of the rolling element and each pocket having tab means on the sides thereof projecting into the pocket to retain the rolling element therein.

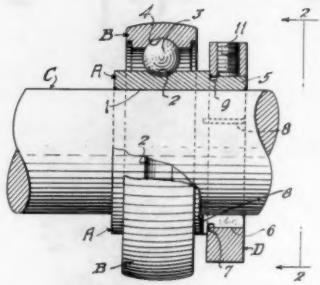


3,588,208

LOCKING DEVICE FOR ANTIFRICTION BEARING RING

Thomas E. Kane, Westport, Conn., assignor to Tek Bearing Company, Bridgeport, Conn.

Filed Sept. 19, 1969, Ser. No. 859,443
Int. Cl. F16c 35/06
U.S. Cl. 308—236 5 Claims



A cylindrical extension is provided at one or each end of the load-carrying raceway portion of the inner race ring of an antifriction bearing whose inner peripheral surface has a slip fit on a shaft; said extension has three slots spaced equidistantly circumferentially of the extension and extending longitudinally inwardly from the end of the extension to an area short of the raceway and beyond an external shoulder against which is adapted to abut a rigid steel ring having a slide fit on said extension and having a setscrew threaded therein to engage said extension at a point diametrically opposite one of said slots and centrally between the other two slots.

3,588,209

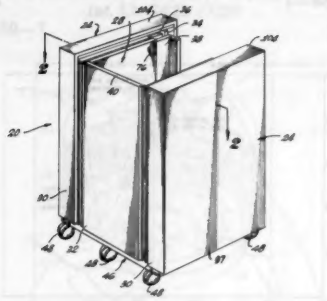
FOLDING COUNTER CONSTRUCTION

Leonard M. Nathan, 8022 Altavan Ave., Los Angeles, Calif.

Filed June 16, 1969, Ser. No. 833,393
Int. Cl. A47b 96/18
U.S. Cl. 312—140.2 14 Claims

A folding counter having a central cabinet and movable side housings connected to a front panel of the cabinet by folding front panels. The side housings house three vertically nested shelves which are horizontally disposed at fixed vertical intervals to provide work and shelf spaces when the

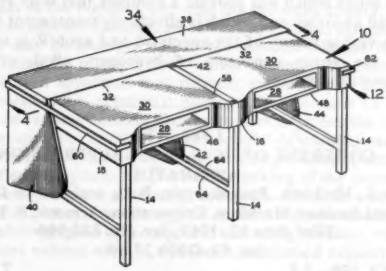
counter is opened. The central cabinet and side housings are mounted on an underframe with the sections of the underframe supporting the side housings being connected to the central section of the underframe by telescoping members.



3,588,210
CONVERTIBLE DESK

John Des Marais, 1856 Lincoln, Fla., and Roger A. Sinigoi, 3186 McKinley, Hollywood, Fla.

Filed July 23, 1969, Ser. No. 843,928
Int. Cl. A47b *17/00*
U.S. Cl. 312—196 9 Claims



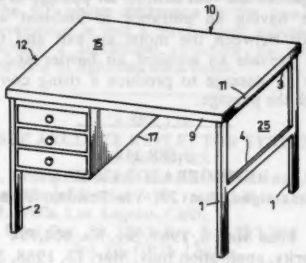
A two-position convertible desk having a panel unit which can be raised to provide privacy for individual learning situations and lowered to retract divider panels for group learning situations. The panel unit includes a rear panel which serves as a screen when the panel unit is raised, and wing panels which divide the desk into two working areas when the panel unit is raised. When the panel unit is lowered, the rear panel extends the working area of the desk, and the wing panels retract nearly out of the way.

3,588,211
DESK

Bruce R. Ogden, Marrickville, New South Wales, Australia, assignor to Claude R. Ogden & Co. Pty. Limited, Marrickville, Australia

Filed Dec. 20, 1968, Ser. No. 785,663
Claims priority, application Australia, Dec. 22, 1967, 31,632/67
Int. Cl. A47b *17/00*
U.S. Cl. 312—194 3 Claims

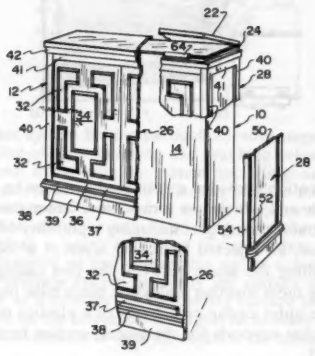
A desk having a wooden top on a tubular metal frame, a chest of drawers at one or both ends of the desk fixed to the frame and the top and a back panel fixed to the frame and the chest(s) of drawers.



3,588,212
DECORATIVE OVERWRAP CABINET STRUCTURE

Richard G. Gersch, Detroit, and Kip J. Hoag, Albion, Mich., assignors to McGraw-Edision Company, Elgin, Ill.

Filed Oct. 22, 1969, Ser. No. 868,343
Int. Cl. A47b *17/04, 97/00*
U.S. Cl. 312—204 8 Claims

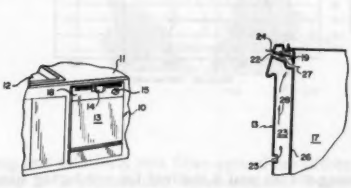


A decorative cabinet, including a structural case and an overwrap having at least one plastic panel secured over the case wall, which panel has an integral corner section covering the adjacent case corner and spring clip means holding coextensive edges of the case and overwrap together, and cooperating camming tabs, flange and panel configurations for snugly securing separate overwrap panels to the case.

3,588,213
AIR VENT FOR AN APPLIANCE

Albert T. Braga, Stevensville, and James G. Ruspino, St. Joseph, Mich., assignors to Whirlpool Corporation

Filed Apr. 22, 1969, Ser. No. 818,306
Int. Cl. A47b *81/00, 97/00*
U.S. Cl. 312—214 5 Claims



An appliance comprising a cabinet having an interior normally containing warm moist air, a vent having an exit open-

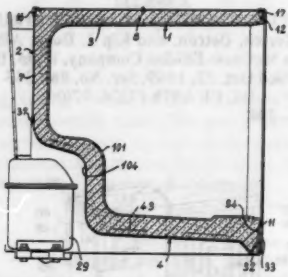
ing for venting the warm moist air from the interior, a surface member adjacent the vent exit, an air passage in one wall of the cabinet having an entrance to ambient air and an elevated exit between the moist air exit and the surface member to provide an ambient air barrier and means for heating the air passage to produce a rising convection air flow through the passage.

3,588,214

REFRIGERATOR CABINET

Alberto Stimamiglio, Km 27, Via Pontina, Pomezia-Roma, Italy

Filed Mar. 6, 1969, Ser. No. 804,794
Claims priority, application Italy, Mar. 13, 1968, 35,505A/68
Int. Cl. A43b *81/00*
U.S. Cl. 312—214 **9 Claims**



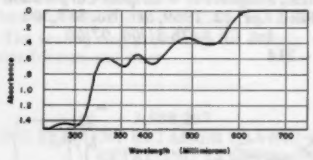
The invention provides a casing which may be used for a refrigerator and which has a one piece inner casing part, a multipart outer casing part including a plurality of plates and section bars, an injected insulating layer of a foam plastics material filling the space between the two casing parts and connecting them together and a one piece base plate forming part of the outer casing part, being of a plastics material and having socket supports for the plates, section bars and inner casing part.

3,588,215

SPECTRAL BALANCING FILTER FOR FLUORESCENT SOURCES

Harbans Singh, Tampa, Fla. (Box 37 Rte. 1, Odessa, Fla., 33556)

Filed Oct. 3, 1966, Ser. No. 583,789
Int. Cl. G02b *5/20*
U.S. Cl. 350—1 **2 Claims**



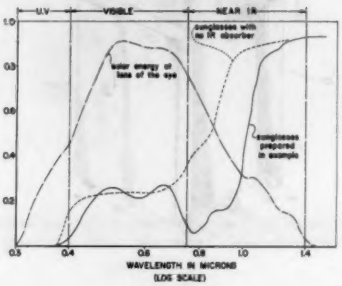
A balancing means and a method for producing spectrally balanced light is provided which comprises an optical transmission carrier and dye thereon selectively absorbing at least about 25 percent of the peak emissions of mercury discharge spectral energy sources.

3,588,216

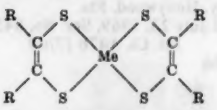
PLASTIC OPTICAL ELEMENTS

Stanley Morton Bloom, Waban, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sept. 2, 1966, Ser. No. 577,576
Int. Cl. F21v *9/04*; **G02b** *5/22*, *5/30*
U.S. Cl. 350—1 **12 Claims**



An element for filtering infrared light useful for example, as an optical lens. A metal complex is advantageously employed as an infrared absorber in elements of the type described. The infrared absorbers can be represented by the following formula:



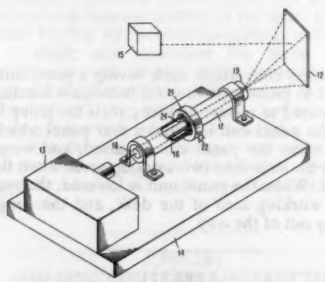
where Me is a metal of the first, second or third transition metal series which will provide a complex that is an effective infrared absorber and which is effectively transparent to light in the visible region of the spectrum and each R is selected from the group consisting of hydrogen, alkyl, aromatic heterocyclic rings.

3,588,217

COHERENT OPTICAL NOISE SUPPRESSION APPARATUS

Einar S. Mathisen, Poughkeepsie, N.Y., assignor to International Business Machines, Corporation, Armonk, N.Y.

Filed June 17, 1969, Ser. No. 833,906
Int. Cl. G02b *27/00*
U.S. Cl. 350—3.5 **7 Claims**

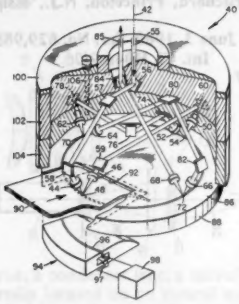


In an apparatus for displaying the image of a hologram, a fiber optic device is located to form part of the path of the coherent light illuminating the hologram and is moved at its midsection while the ends are held rigid as the hologram is viewed. This operation of the apparatus changes the interference patterns that are attributable to the light source and not the hologram and thereby reduces speckle noise that otherwise occurs in the hologram.

3,588,218
MULTIPLE SPOT, OPTICAL SCANNER UTILIZING PERIODIC LIGHT BEAM REFOCUSING

Robert P. Hunt, Menlo Park; Baron C. Dickey, East Palo Alto, and Samuel Bousky, Redwood City, Calif., assignors to Ampex Corporation, Redwood City, Calif.

Filed Oct. 27, 1969, Ser. No. 869,785
Int. Cl. G02b 17/00
U.S. Cl. 350—7 10 Claims



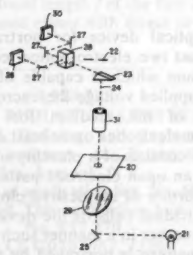
A multiple spot scanner utilizing an optical relay system in which at least one optical beam is periodically refocused to define a plurality of scanning light spots along a common scan locus. In a basic embodiment of a multiple spot scanner, the relay system reflects the beam around the perimeter of a square utilizing lenses and mirrors mounted within a rotating drum. The drum, and thus, the scan locus, is disposed against a lossless high reflectivity mirror. The focused beam forming the spots thus are returned to the rotating drum after each spot formation. A selected portion of the mirror is replaced with a length of a recording medium. Thus, all but one of the multiple number of spots formed by the relay system are returned to the scanner in a lossless fashion, while at all times one spot is scanning the recording medium. A modulating magnetic field is provided to determine the state of magnetization of the medium, and thus the recorded history.

Various adjunct features, associated apparatus, and modifications, may be incorporated in accordance with the invention utilizing the multiple spot optical scanner. For example, the invention apparatus may include; magnetooptic readout (light polarization rotation); photographic readout (a light amplitude readout scheme disposed either adjacent the medium or outside the optical system), a light differential cancellation scheme, a plurality rather than a single entrant beam, a spot deflecting system for providing tracking of the recorded scan lines during the readout process, etc. Thus, in a record and/or readout system the optical scanner may be employed with a photographic or a magnetic recording medium, which determines various ones of the above mentioned adjunct features.

3,588,219
POLARIZED LIGHT BINOCULAR MICROSCOPE

Dean Lusted, Norwichtown, Conn., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Nov. 15, 1967, Ser. No. 683,377
Int. Cl. G02b 5/30
U.S. Cl. 350—14 4 Claims

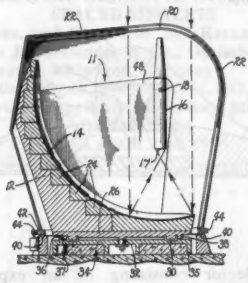


The beam-splitting cube of binocular microscopes produces light polarized by reflection. A single calibrated polarizing filter between the light source and a specimen being observed can be rotated to maximize or minimize the effect of the 90° phase difference in the two oculars. A further convenience is that a birefringent substance can be localized within a significant structure by simultaneous, binocular viewing of light and dark fields.

3,588,220
ROTABLE ARCUATE REFLECTOR SYSTEM FOR TELESCOPES

T. O. Paine, Acting Administrator of the National Aeronautics and Space Administration with respect to an invention of, Willard H. Wells, Los Angeles, Calif.

Filed Dec. 30, 1968, Ser. No. 787,846
Int. Cl. G02b 17/00
U.S. Cl. 350—55 3 Claims

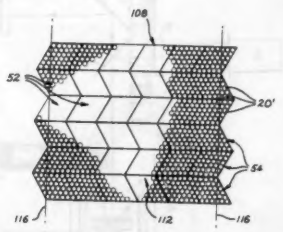


A reflector system having particularly advantageous application to line-of-sight pointing and tracking telescopes and characterized by a primary system including an arcuate, striplike segment of a dished, reflecting surface mounted for azimuth rotation and a secondary system supported for elevational rotation about an axis fixed relative to the surface of the segment at a point such that the secondary system is caused to describe an arc intersecting points adjacent to the foci of the primary system, whereby the surface of the segment serves as a primary light-gathering surface for an optical telescope as the telescope is employed to train and track a moving point-source of light throughout the celestial hemisphere.

3,588,221
FIBER OPTICAL MULTIFIBERS AND DEVICES FORMED THEREOF

Walter P. Siegmund, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

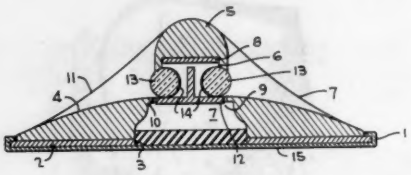
Filed Jan. 2, 1968, Ser. No. 694,609
Int. Cl. G02b 5/16
U.S. Cl. 350—96 4 Claims



A long and relatively thin fiber optical multifiber structure is formed to a rhomboidal cross-sectional shape so as to achieve maximum packing density of convolutions of a similarly shaped fiber drawn from the structure and machine wound on a drum to form a ribbon of several fiber widths for use in the construction of fiber optical image-conducting fiberscopes and the like. The fiber is helically wound with

one flat side thereof against the drum using a lead no greater than that of the width of said one flat side and moving parallel to the drum in the general direction of slope, toward the drum, of adjacent sides of the fiber. It is also contemplated that the winding lead be slightly less than said width of the fiber to assure maximum packing density. A plurality of ribbons are superposed with the oblique sides of the rhomboidal multifibers in alternate ribbons being nonaligned.

3,588,222
ROAD REFLECTORS
Harold A. Julius, 101, Summerset Hall, Central Ave., Illovo, Republic of South Africa
Filed Nov. 1, 1968, Ser. No. 772,658
Claims priority, application, Republic of South Africa, Nov. 9, 1967, 67/6721
Int. Cl. G02b *17/02*
U.S. Cl. 350—100 **3 Claims**

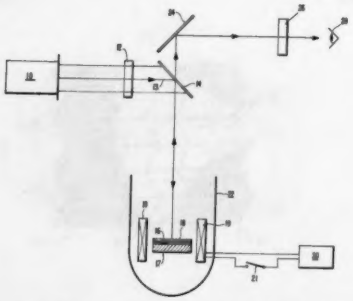


A road reflector consisting of an exposed hollow elastomeric body housing one or a pair of oppositely directed cylindrical reflectors adapted to be pushed downwardly into the hollow interior of the body by pressure of a vehicle, thereby causing each reflector to be cleaned by a wiping rib forming part of the body, which latter is mounted on a rigid platelike base adapted to be directly adhesively united to a road surface.

ERRATUM

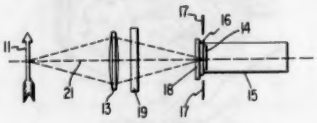
For Class 350—151 see:
Patent No. 3,588,749

3,588,223
MAGNETO-OPTICAL PROCESS FOR DETERMINING SUPERCONDUCTIVITY
James H. P. Watson, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.
Filed Mar. 20, 1969, Ser. No. 808,912
Int. Cl. G02f *1/18*
U.S. Cl. 350—151 **8 Claims**



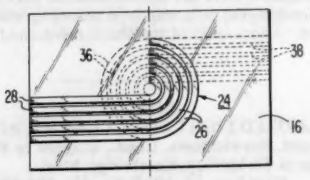
A process for determining superconductivity in films of varying composition is disclosed. A sheet of cerium phosphate glass is placed over the film, a beam of polarized light is reflected off the film, the film is subjected to a magnetic field for a short period of time as well as incremental reductions in its temperature, and an analyzer is placed in the path of the reflected beam for observing and making a permanent record of the superconducting regions as they occur in the film for each reduction in temperature.

3,588,224
ADJUSTABLE BANDWIDTH OPTICAL FILTER
Dalton Harold Pritchard, Princeton, N.J., assignor to RCA Corporation
Filed June 3, 1969, Ser. No. 829,988
Int. Cl. H04n *9/06*
U.S. Cl. 350—157 **9 Claims**



The optical apparatus used in a television system, for example, includes a series arrangement of three birefringent elements of different thickness interspersed with two quarter wave delay elements to constitute an optical filter. The filter is placed in the light path between an object and the image formed at the photosensitive element of a camera tube. The spatial frequency bandwidth of the light passing through the filter is controllable in one or more directions and in the same or different amounts in a plurality of different directions by suitable dimensioning of the birefringent elements and/or by appropriate rotational positioning of the entire filter about the optical axis.

3,588,225
ELECTRO-OPTIC DEVICES FOR PORTRAYING CLOSED IMAGES
Lawrence Joseph Nicastro, Philadelphia, Pa., assignor to RCA Corporation
Filed Jan. 27, 1970, Ser. No. 6,060
Int. Cl. G02f *1/28*
U.S. Cl. 350—160 **8 Claims**

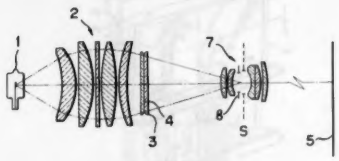


An electro-optical device for portraying closed images comprises at least two electro-optical cells in tandem. Each cell has a medium which is capable of modulating light in response to an applied voltage thereacross and electrodes on opposite sides of the medium for applying a voltage thereacross. The electrodes on at least one side of the medium of each cell consists of a plurality of separate electrodes so as to define an open electrode pattern. This pattern corresponds to a portion of the desired closed image to be portrayed. The individual cells of the device are arranged with respect to one another in a manner such that in operation the desired closed pattern is portrayed by the composite of the open patterns of the individual cells. Typical electro-optical medium is a nematic liquid crystal composition.

3,588,226
VARIABLE-MAGNIFICATION MICROFILM PROJECTOR EMPLOYING INTERCHANGEABLE LENSES WITH CONSTANT EXIT PUPIL POSITIONING

Yohei Ikezu, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed Mar. 11, 1969, Ser. No. 806,195
Claims priority, application Japan, Mar. 14, 1968, 43/16675
Int. Cl. G02b *15/08*
U.S. Cl. 350—183 **3 Claims**

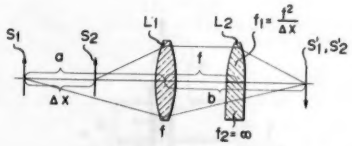


A light source, a condenser lens, a microfilm holder, and a screen are fixedly located on an optical axis. A plurality of interchangeable lenses of varying focal lengths may be successively positioned on the optical axis between the microfilm holder and the screen, the exit pupil of all such lenses being positioned at substantially the same position relative to the position of microfilm in the microfilm holder, i.e., substantially at the position where the condenser lens forms an image of the light source.

3,588,227
LENS SYSTEM FOR FOCUSING TWO SPACED OBJECTS ON THE SAME FOCAL PLANE

Tadaaki Yamamoto, Kawasaki-shi, and Hiroshi Takenaka, Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Apr. 18, 1969, Ser. No. 817,443
Claims priority, application Japan, Apr. 25, 1968, 43/27336
Int. Cl. G02b *3/10*
U.S. Cl. 350—194 **7 Claims**



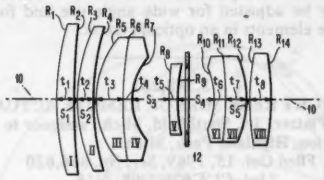
A lens system is provided for focusing two spaced objects on the same focal plane, the images of the objects being of equal magnification. The lens system includes a positive front lens group having a focal length f and a positive rear lens group having a focal length $f'=f^2/\Delta x$ where Δx is the distance between the two objects. The region below the optical axis of the rear lens group is of zero refractive power and the distance between the principal planes of the two lens groups is made equal to the focal length f of the first lens group. The lens system may be used either with direct or reflected types of illumination.

3,588,228
VARIABLE REDUCTION LENS SYSTEM

Janusz S. Wilczynski, Ossining, and Raymond E. Tibbetts, Mahopac, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of application Ser. No. 600,158, Dec. 8, 1966, now abandoned. This application Aug. 15, 1969, Ser. No. 857,270
Int. Cl. G02b *9/62, 15/06*
U.S. Cl. 350—215 **2 Claims**

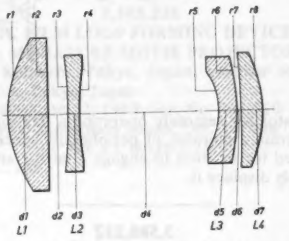
The present invention relates to optical lens systems and more particularly to a lens system having variable magnification and constant high correction. The lens system consists of eight lens elements and changes in reduction are produced by varying the shape of one lens element and changing one airspace while the remaining lens elements and air spaces remain constant.



3,588,229
PHOTOGRAPHIC OBJECTIVE WITH FOUR AIR-SPACED SINGLETS

Walter Woltche, and Klaus Elle, bad Kreuznach, Germany, assignors to Jos Schneider & Co., Optische Werke Kreuznach, Kreuznach, Rhineland, Germany

Filed July 18, 1969, Ser. No. 842,945
Claims priority, application Germany, July 19, 1968, P 17 97 279.1
Int. Cl. G02b *9/36, 9/56*
U.S. Cl. 350—221 **4 Claims**

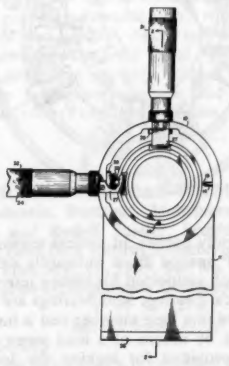


Photographic objective, especially telephoto objective, with four air-spaced singlets forming a front group and a rear group, the front group consisting of a biconvex first lens and a biconcave second lens, the rear group consisting of a third lens in the form of a negative meniscus and a fourth lens in the form of a positive meniscus.

3,588,230
ADJUSTABLE LENS MOUNT

Thomas H. De Rieux, Washington, D.C., assignor to the United States of America as represented by the Secretary of the Navy

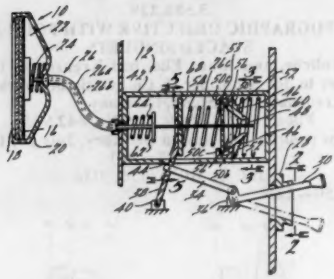
Filed Jan. 13, 1969, Ser. No. 790,685
Int. Cl. G02b *7/02*
U.S. Cl. 350—252 **4 Claims**



This disclosure is directed to a mount for optical elements such as mirrors, lens, prisms, etc. which enables one to make

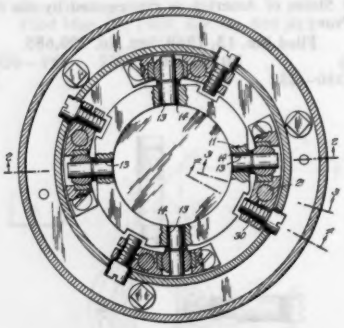
a fine adjustment in both the horizontal and vertical directions for precision alignment. The mount is thin and the adjusting means are positioned on the side such that the mount may be adjusted for wide angle use and for closely stacking the elements in an optical system.

3,588,231
DAY-NIGHT REAR MIRROR REMOTE ACTUATOR
George E. Platzer, Jr., Southfield, Mich., assignor to Chrysler Corporation, Highland Park, Mich.
Filed Oct. 15, 1969, Ser. No. 866,620
Int. Cl. G02b *5/08, 7/18*
U.S. Cl. 350—279 11 Claims



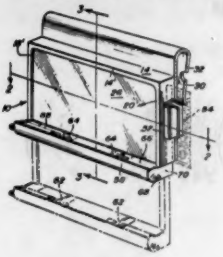
An actuator for remotely operating a day-night rear view mirror wherein a plurality of peripherally spaced lever arms are mounted for rotation to engage a mirror actuating cable and shiftably displace it.

3,588,232
PRECISION ADJUSTABLE ASSEMBLY FOR AN OPTICAL BENCH MARK
Joseph Mostel, Brooklyn, N.Y., assignor to the United States of America as represented by the Secretary of the Navy
Filed Dec. 15, 1969, Ser. No. 885,133
Int. Cl. G02b *5/08*
U.S. Cl. 350—288 4 Claims



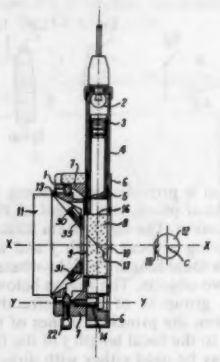
A ring holder rigidly carries an optical mirror and is provided with four 90° spaced apart outwardly extending stub shafts which are each supported for sliding movement in the bushing of a spherical bearing. Said bearings are each held in a yoke which is fixed in a base member and is independently, vertically adjustable by means of a lead screw through the yoke. Means are provided for locking the lead screw to prevent disturbing the mirror after it has been locked. The mirror can be adjusted in two planes while holding the center thereof fixed.

3,588,233
EXTENDABLE SUN VISOR MIRROR
Charles E. Lambert, Sandy, Utah, assignor to Visor Mirror Corp.
Filed July 9, 1968, Ser. No. 743,340
Int. Cl. G02b *5/08*
U.S. Cl. 350—292 4 Claims



A mirror construction including a mounting clip structure for removably clipping the mirror construction to a pivoted sun visor of an automobile with the mirror overlying that side of the sun visor facing the inside of the automobile when the sun visor is in the lowered position, the mirror construction including a supplemental or extendable mirror section telescopingly received therein and extendable from the edge portion thereof corresponding to the free edge portion of the associated sun visor and releasably retainable in extended position for increased mirror viewing of a person not driving the associated vehicle.

3,588,234
OPTICAL DEVICE FOR MOVING A LUMINOUS TARGET ACROSS THE EYES
Paul Frederic Gambs, 140, Rue Mazenold 69, Lyon, France
Filed Mar. 17, 1969, Ser. No. 807,788
Claims priority, application France, Mar. 18, 1968, 144,244
Int. Cl. A61b *3/10*
U.S. Cl. 351—13 8 Claims



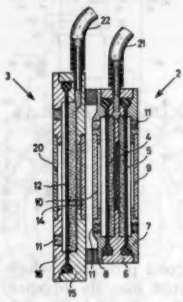
An optical device for effecting movement of a luminous target along variable converging directions in the eye is provided with a reflecting system. The luminous target is mounted for pivotal movement relative to the reflecting system about an axis passing through a point conjugate with the center of the eye being examined. The reflecting system itself is mounted for rotational movement and suitable indicia are provided to indicate both the amounts of relative pivotal movement and rotational movement. The optical device is also provided with a plurality of screws for removably attaching same to an ocular instrument, such as an ophthalmometer.

3,588,235

ARRANGEMENT FOR DETERMINING THE REFRACTION OF THE HUMAN EYE

Nils B. Jacobson, Solna, and Jan R. Bolmgren, Sollentuna, Sweden, assignors to Medinova Aktiebolag, Solna, Sweden

Filed Aug. 15, 1969, Ser. No. 850,421
Claims priority, application Sweden, Sept. 3, 1968, 11807/1968
Int. Cl. A61b *3/04*; G02b *1/06*
U.S. Cl. 351—19 33 Claims



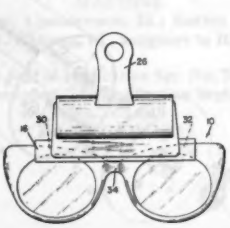
An apparatus for measuring spherical refraction error and a stigmatism. A combination lens system includes a spherical fluid lens and a cylindrical fluid lens, the two lenses being aligned for concurrent use. The dioptric value of each lens is varied by introducing and removing liquid therefrom by means of a bellows pump. Control devices control operation of the pump and the readings of the dioptric value of the lens can be combined or read separately.

3,588,236

CLAMP FOR EYEGLASS FRAMES

Joseph G. Moller, 136 Coolidge Road, Worcester, Mass.

Filed Nov. 20, 1969, Ser. No. 878,429
Int. Cl. G02c *11/00*; A44b *21/00*
U.S. Cl. 351—158 1 Claim



A spring clamp for temporary attachment to the frame of eyeglasses. The jaws of the clamp have inwardly facing pads which tend to bend the frame so that the attached temples move toward each other.

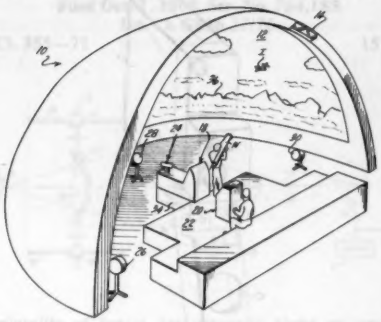
3,588,237

MOVING TARGET SIMULATOR

John A. Aldrich, Lutherville, Md., assignor to the United States of America as represented by the Secretary of the Navy

Filed Feb. 5, 1969, Ser. No. 796,693
Int. Cl. F41j *5/08*, *9/14*; G03b *21/52*
U.S. Cl. 352—39 6 Claims

Apparatus is described for training personnel in the aiming and launching of a shoulder fired anti-aircraft weapon. The apparatus comprises a curved screen, film projection apparatus for projecting an aircraft image in proper attitude throughout a trajectory determined by data coded on the film and converted by decoding means to commands for moving a projection beam deflecting gimballed mirror in the projection apparatus. Target infrared emission is simulated by means for



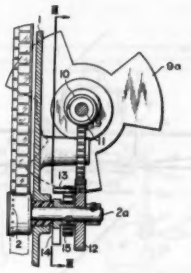
generating and mixing infrared energy with the projection beam.

3,588,238

AUTOMATIC FILM LOOP FORMING DEVICE FOR USE IN MINIATURE MOVIE PROJECTOR

Tokusaburo Kakiuchi, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed Oct. 2, 1968, Ser. No. 764,510
Claims priority, application Japan, Oct. 17, 1967, 42/66736
Int. Cl. G03b *1/58*
U.S. Cl. 352—159 9 Claims



A sprocket placed between a projection aperture and a takeup reel advances film to the takeup reel. The sprocket is driven by a gear train connected to a rotating shutter shaft. A spring-loaded lost motion device permits the sprocket to remain motionless during the initial operation of a pulldown claw at the projection aperture, so that a loop of film forms between the projection aperture and the sprocket. The sprocket then rotates and feeds the film.

3,588,239

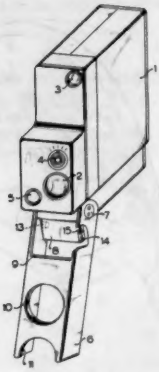
MOTION PICTURE CAMERA WITH MOVABLE HANDLE

Roland Hochstein, Stuttgart, Mohringen; Gerhard Borner, Musberg, and Rudolf Taesler, Leinfelden, Germany, assignors to Zeiss Ikon Aktiengesellschaft, Stuttgart, Germany

Filed May 15, 1969, Ser. No. 824,760
Claims priority, application Germany, May 30, 1968, P 17 72 527.8
Int. Cl. G03b *17/00*
U.S. Cl. 352—243 4 Claims

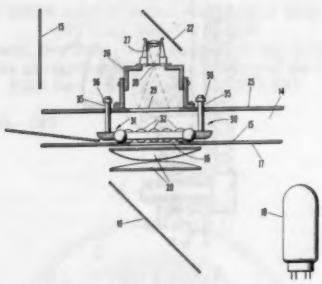
A motion picture camera is provided with a movable handle shell with an open side into which enters a narrow side of the camera casing when the handle is moved into its inoperative position flat against the camera. In the operative position

of the handle, the same is moved to extend outwardly from the camera. In this position the thumb of the hand gripping



the handle is able to operate the release member of the camera.

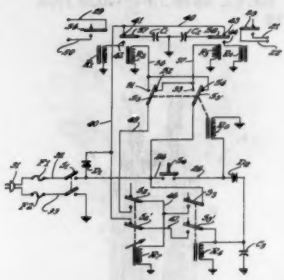
3,588,240
X-RAY DISPLAY MEANS
Shintaro Asano, Cambridge, and Larry K. Baxter, Lexington, Mass., assignors to Shintron Company, Inc., Cambridge, Mass.
Filed Apr. 9, 1968, Ser. No. 719,928
Int. Cl. G03b *21/14, 21/28*
U.S. Cl. 353—85 **4 Claims**



An X-ray film holder consisting of a folded sheet having a series of aligned removable sections defined by perforations which may be selectively removed for inserting strips of X-ray films. A display machine for use with the holder has a horizontal slot to receive the holder. An electrical circuit controls a light source and cooling fan. The light source is turned on by insertion of the holder into the slot. This function is attained by a circuit which includes a ball bearing race and conductive plate which upon separation actuates a relay means turning on the light source. The ball bearing race is separated from the conductive plate by insertion of the holder into the slot.

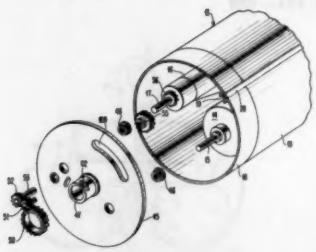
3,588,241
SPECIAL SYNCHRONIZER
Cecil A. Broom, Forest Park, Ill., assignor to Richard J. Powers, Elmhurst, Ill.
Filed Jan. 7, 1969, Ser. No. 789,535
Int. Cl. G03b *21/26*
U.S. Cl. 353—94 **11 Claims**

Apparatus for synchronizing a pair of slide projectors or other apparatus so that there is no delay such as occurs with a single slide projector between pictures. Both projectors are alternately loaded with opaque slides, and while one of the projectors is projecting an image on the screen, the other projector has an opaque slide in its lens system. When the advance button is depressed, the projector with the opaque slide is started into its advance cycle and as it nears the end



of its cycle, the second projector, which has been showing the picture, is started into its advance cycle. These two operations are timed so that the picture from the second projector is removed from the screen at the same time as the picture from the first projector is projected onto the screen. The operation is repeated with alternate projectors projecting slides onto the screen.

3,588,242
DRUM STRUCTURE FOR A XEROGRAPHIC COPYING MACHINE
Richard A. Berlier, and Russell W. Rice, Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Jan. 15, 1969, Ser. No. 791,350
Int. Cl. G03q *15/00*
U.S. Cl. 355—16 **18 Claims**



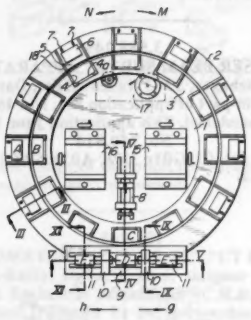
A copy drum which permits automatic advancement or replacement of the reusable photoconductor element in a xerographic copying machine is disclosed. The photoconductor element is stored in flexible strip form on supply and takeup rolls located within the interior of the drum. A photoconductor advance operation is initiated by engaging a clutch which drivingly couples a normally free wheeling drive train to the advancing mechanism. This causes advancing movement of the photoconductor element as the copy drum is rotated by the drive motor used to turn the drum during copying operations. Metering apparatus is located within the interior of the copy drum and actuates a switch to terminate an advance operation when a predetermined length of the photoconductor element has been moved from the supply roll to the takeup roll. A pair of movable and concentric actuating members are located along the axis and at one end of the copy drum for transferring actuating movements between the interior and the exterior of the drum.

3,588,243

CARD HANDLING APPARATUS

Hiroji Osawa, Tokyo; Kazuzo Ishii, Hoya-shi; Yasushi Fujimura, Musashino-shi; Yosiro Nakamura, Tokyo; Kazunori Ueda; Toshio Imai, Neyagawa-shi; Sigeru Araki, Hirakata-shi; Kei Okubo, Neyagawa-shi, and Tadashi Kubota, Osaka, Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan and Matsushita Electric Industrial Co., Ltd., Osaka, Japan, fractional part interest to each

Filed June 9, 1969, Ser. No. 831,412
Claims priority, application Japan, June 14, 1968, 41,513
Int. Cl. G03b 27/62
U.S. Cl. 355—40 8 Claims



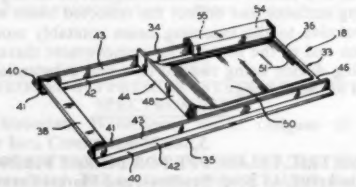
A card handling apparatus which is so designed as to carry out automatically a series of operations including the step of delivering card decks loaded in respective card hoppers to a prescribed position in a desired order upon actuation of a pushbutton or the like, the step of distributing the individual cards of the thus delivered card decks to the left and right, the step of photographing or reading the distributed cards and the step of collecting the cards.

3,588,244

BOOK COPIER ATTACHMENT FOR A PHOTOCOPY MACHINE

Karl M. Murgas, Lincolnwood, Ill.; Burton Greenberg, and Otto A. Clark, Chicago, Ill., assignors to ICP, Inc.,, Skokie, Ill.

Continuation-in-part of application Ser. No. 745,841, July 18, 1968, now abandoned. This application Sept. 23, 1968, Ser. No. 761,648
Int. Cl. G03b 27/62
U.S. Cl. 355—8 15 Claims



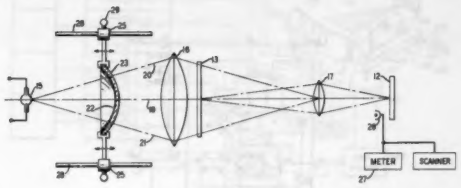
A book copier attachment for a document reproduction apparatus including a frame, a carrier means for movement within the frame when the attachment is positioned on the apparatus. A bearing means secures the carrier in the frame and includes means to enable the carrier to be lifted away from the frame when the attachment is releasably locked on the apparatus,—so that the carrier may be transported across a scanning window for reproducing the original document positioned thereon.

3,588,245

ADJUSTABLE COMPENSATION IN OPTICAL SYSTEMS

Donald R. Herriott, Morris Township, Morris County, and Eric G. Rawson, Murray Hill, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 1, 1968, Ser. No. 764,185
Int. Cl. G03b 27/76
U.S. Cl. 355—71 15 Claims



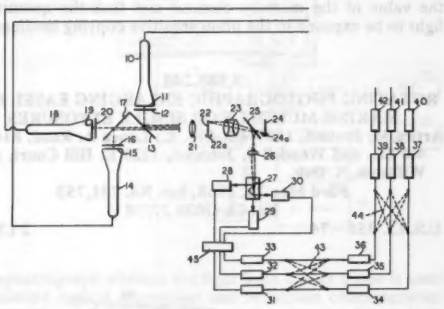
A plurality of lenses are arranged along an optic axis through which light of a substantially single frequency is directed. A spherical interference filter is located symmetrically on the optical axis and is capable of being moved axially or tilted in order to give nonuniform light transmission to compensate for a light intensity gradient created by the plurality of lenses. Other filter configurations are also described.

3,588,246

PHOTOGRAPHIC COLOR PRINTER

Georges July, Pinner, Middlesex, England, assignor to Eastman Kodak Company,, Rochester, N.Y.

Filed Sept. 21, 1967, Ser. No. 669,427
Claims priority, application Great Britain, Sept. 30, 1966, 43,912/66
Int. Cl. G03b 27/76
U.S. Cl. 355—38 8 Claims



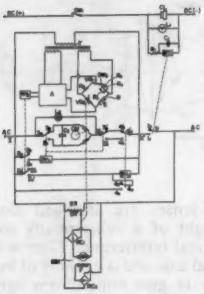
A method and apparatus of masking color records with an exposure pattern that has been electronically corrected for producing color prints from photographic color records. Three flying spot scanning devices having blue, green or red filters, respectively, positioned in front of the face of each of the devices synchronously scan a photographic color record. The filtered light of the flying spot scanning devices is modulated by the color content of the photographic color record. A portion of the modulated light transmitted by the color record is directed to three photoelectric sensing devices each arranged to sense a different color of the transmitted light to provide respective signals representative of the intensity of each color. The respective signals are stored during one scansion of the color record by the flying spot scanning devices and thereafter applied to a correction system wherein the blue, green and red color components are individually corrected to compensate for various conditions in the photographic color record and the copy material. The corrected signals are then fed back to control the intensity of the flying spot scanning devices during a second scansion of the photographic record at which time the color print is made.

3,588,247

AUTOMATIC EXPOSURE CONTROL DEVICE FOR COPYING MACHINE

Koji Noda, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 10, 1968, Ser. No. 728,283
Claims priority, application Japan, May 17, 1967, 42/31,372
Int. Cl. G03b *27/26*
U.S. Cl. 355—69 **9 Claims**



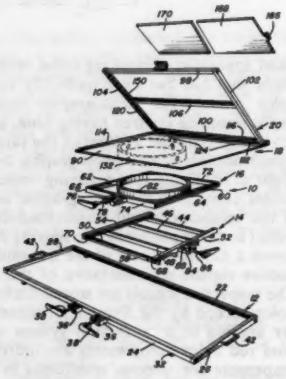
The exposure mechanism in a copying machine has associated therewith a memory element which is determinative of the quantity of light exposed to a photosensitive copying medium. A bridge circuit contains a variable resistance element and a photosensitive element, the resistance of which changes with the optical properties of an original to be copied. A reversible motor operates to vary the values of both the memory element and the variable resistance element when there is an imbalance in the bridge circuit, the direction of which variations being determined by the polarity of the imbalance. When the bridge circuit is balanced by changing the resistance presented by the variable resistance element, the motor ceases to operate, thereby establishing the value of the memory element and thus the quantity of light to be exposed to the photosensitive copying medium.

3,588,248

ROTATING PHOTOGRAPHIC ENLARGING EASEL FOR MAKING MULTIPLE OR SINGLE EXPOSURES

Artice M. Freund, 1109-4th Ave. E.; Laura A. Raad, 810 W. 4th St., and Wendell J. Johnson, 1220 E. Hill Court, all of Williston, N. Dak.

Filed May 24, 1968, Ser. No. 731,753
Int. Cl. G03b *27/58*
U.S. Cl. 355—74 **2 Claims**



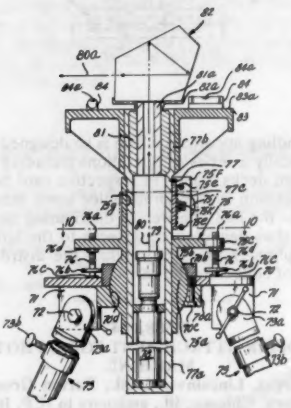
An apparatus for making multiple or single enlarged exposures of the same or different images on a single large sheet of print paper including a base adapted to be stationarily positioned relative to an enlarger, a first frame supported from the base for rectilinear shifting in one horizontal direction, a second frame supported from the first frame for rectilinear shifting in a second horizontal direction disposed at right angles to the first mentioned direction and a generally horizontal print paper table supported from the second frame for horizontal rectilinear shifting therewith and rotatable relative to the second frame about a vertical axis. The print paper table includes a hinged cover frame which may be swung into and out of position overlying photographic print paper disposed on the table and the cover frame includes horizontally shiftable and overlapable masking panels operative to mask, in a light tight manner, and unmask preselected areas of the photographic print paper disposed on the table.

3,588,249

LASER BEAM SURVEY APPARATUS

Robert H. Studebaker, 5343 Kellenburger, Dayton, Ohio

Continuation-in-part of application Ser. No. 468,821, July 1, 1965, now abandoned. This application June 17, 1968, Ser. No. 740,814
Int. Cl. G01c *3/08*; **A01b** *69/00*
U.S. Cl. 356—4 **16 Claims**



This invention relates to a device for supporting and rotating a laser beam in establishing a survey reference plane with exacting accuracy. The device comprises a hollow housing in the cavity of which a laser beam generator is contained with the laser beam projecting out an open end of the housing cavity, the housing being supported for adjustment with reference to a unitary beam deflecting device having multiple reflecting surfaces that deflect the reflected beam at a fixed angle relative to the incoming beam rotatably mounted on the open end of the housing for comovement therewith, the deflecting device being rotated as a unit substantially about the axis of the housing.

3,588,250

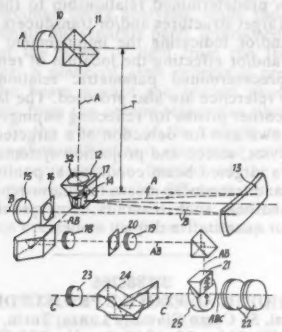
TELEMETRIC TELESCOPE FOR DIRECT FIRING ARMS

Francois Arene, 46 Blvd. Bessieres, and Marcel Deramond, 12 Rue Barrault, Paris, France

Filed Feb. 2, 1967, Ser. No. 613,496
Claims priority, application France, Feb. 9, 1966, 49,011
Int. Cl. G01c *3/04*
U.S. Cl. 356—8 **2 Claims**

A telemetric telescope providing coincidence between two images ensuring on the one hand the observation of an area to be watched and on the other hand the measurement of the distances of targets lying in said area; the telescope is adapted to give through a mere sighting and without any focusing the distance of at least one predetermined point of

the field of fire and according to a modification the telescope makes the arm carrying it assume the angle of elevation corresponding to the range of the point for which the telemeter is adjusted through image coincidence.



3,588,251

SPECTROMETER INPUT OR OUTPUT DEVICES

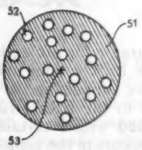
Jacques Moret-Bailly, Dijon, France, assignor to Centre National De La Recherche Scientifique (C.H.R.S.), Paris and Office National D'Etudes Et De Recherches Aerospatiales (Onera), Chatillon-sous-Bagneux, France

Filed Aug. 24, 1967, Ser. No. 663,104

Claims priority, application France, Sept. 1, 1966, 74,895

Int. Cl. G01j *3/00*

U.S. Cl. 356—74 **12 Claims**



Input and/or output gate for grid-type spectrometer with a multiplicity of substantially identically shaped, randomly distributed zones of a radiation transmissivity different from that of the background, the total area of the zones being preferably equal to that of the background outside the zones. The zones extend only over a small fraction of the overall grid surface in any dimension and, when the grid is to be used as a combined input and output gate in an autocollimating spectrometer, may be arranged in pairs symmetrically positioned with reference to a common center.

3,588,252

BACKGROUND SUPPRESSION SYSTEM FOR OPTICAL SPECTROMETER

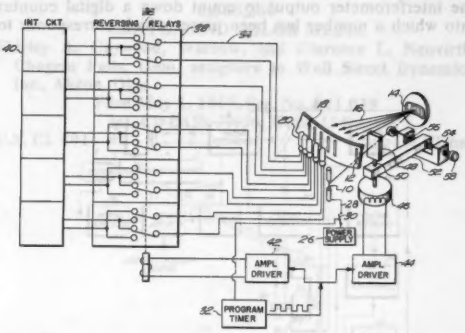
Kaspar Habosian, Watertown, Mass., assignor to Baird-Atomic Inc., Cambridge, Mass.

Continuation of application Ser. No. 602,010, Dec. 15, 1966, now abandoned. This application Sept. 17, 1969, Ser. No. 859,249

Int. Cl. G01j *3/20, 3/30*

U.S. Cl. 356—82 **1 Claim**

Optical spectrometers currently employ photodetecting devices to charge capacitors in measuring the intensity of monitored line spectra. The radiant energy falling upon the photodetectors, in addition to the spectral line of interest also includes background energy which is the bandspectra superimposed on the line spectra. The background amounts to noise and adversely affects the accuracy of the instrument. This invention involves the elimination of the background noise by oscillating the line spectra across the slit and sequentially charging and discharging the measuring capacitors associated with the photodetectors to average out the background noise.



3,588,253

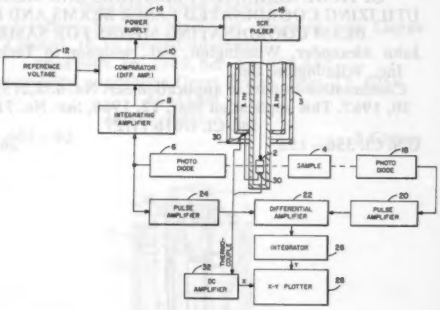
TEMPERATURE TUNABLE LASER DIODE SPECTROGRAPH

Horst R. Wittmann, Huntsville, Ala., assignor to the United States of America as represented by the Secretary of the Army

Filed May 5, 1969, Ser. No. 821,584

Int. Cl. G01j *3/42*; **H01s** *3/00*

U.S. Cl. 356—93 **2 Claims**



A spectrograph wherein the light from a laser diode is used to examine optical absorption and reflection characteristics of a sample material. A laser diode is maintained in a temperature controlled environment. The variation of the temperature of the diode is used to vary the wavelength of the single mode emission from the diode. The monochromatic light emitted by the diode is used to examine the reflection or absorption edge of sample materials. Photodiodes are used to convert light pulses into electrical pulses. The degree to which the single mode, narrow band laser light is attenuated by the sample and the wavelength at which absorption or reflection edges occur is determined by a differential method.

3,588,254

FREQUENCY CONTROL FOR TUNABLE LASER UTILIZED IN A POSITION CONTROL SYSTEM

John M. Rhoades, Waynesboro, Va., assignor to General Electric Company

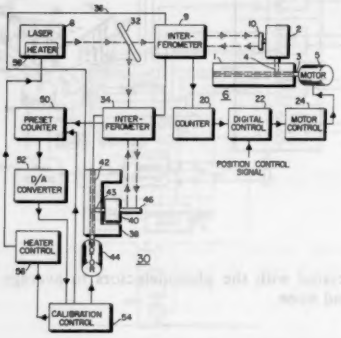
Filed Sept. 13, 1968, Ser. No. 759,721

Int. Cl. G01b *9/02*

U.S. Cl. 356—106 **13 Claims**

A calibration system for a tunable laser utilized as a position indicating device in a position control system includes an

interferometer counting the interference fringes in a pattern produced by the laser output and a portion of the output returned from a prism disposed on a carriage which is moved through a precisely known, repeatable movement. By using the interferometer output to count down a digital counter into which a number has been preset which corresponds to



the change in the number of fringes that should be observed at a given laser frequency, any remaining count after the movement indicates error due to changes in transmission characteristics of the beam path. The remaining count may then be used to provide an analog voltage for adjustment of the laser frequency.

3,588,255

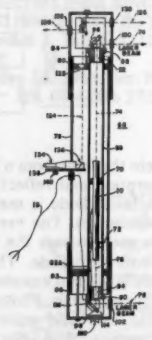
OPTICAL ALIGNMENT METHODS AND MEANS UTILIZING COORDINATED LASER BEAMS AND LASER BEAM COORDINATING MEANS FOR SAME

John Alexander, Wilmington, Del., assignor to Technidyne, Inc., Wilmington, Del.

Continuation-in-part of application Ser. No. 632,279, Apr. 20, 1967. This application Mar. 12, 1968, Ser. No. 712,514

Int. Cl. G01b *11/27*

U.S. Cl. 356—153 **26 Claims**



Systems and methods for establishing and maintaining a laser beam as a straight line reference in space are provided in which a laser device emitting two laser beams in opposed straight line relationship is utilized in combination with reflective targets for each of the laser beams. The laser device and one of the targets are fixed at predetermined points in space and one of the beams is aligned on the one target. This constrains the other beam to a given position in space and the other target is placed in fixed alignment therewith at a random point in space to provide a reference point permitting the removal of the first target and/or destruction of its associated physical location without affecting the ability of the system to maintain substantially exact initial alignment of the beam. Other systems are provided for specifically determining subterranean location of pipeline inverts and/or centerlines referenced to the straight line reference and for establishing a subterranean laser beam reference in predetermined relationship to the straight line reference. Target structures and/or transducers for detecting, reflecting and/or indicating the impingement thereon of a laser beam and/or effecting the location of remote points in space of predetermined parametric relationship to said straight line reference are also provided. The laser beam targets utilize corner prisms for reflecting impinged beams back along their own axis for detection of a targeted condition at the laser device, screen and projection systems for visual indication of a targeted beam condition at points adjacent the laser beam and transducer means for alarm-type readout of a targeted condition, such readouts being provided either in qualitative or quantitative display modes.

3,588,256

OPTICAL PROFILE PROJECTOR

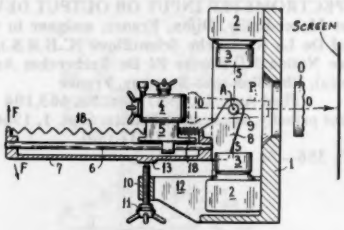
Piero Derossi, 55 Corso Giovanni Lanza, Turin, Italy

Filed May 12, 1969, Ser. No. 823,573

Claims priority, application Italy, June 12, 1968, 52,015-A/68

Int. Cl. G01b *9/08*

U.S. Cl. 356—164 **4 Claims**



An optical comparator for projecting on a screen the sections of a workpiece, for checking and comparison purposes, wherein the structure supporting the projected workpiece is pivotally connected to the fixed structure of the projector, and may be oscillated within certain limits for suppressing masking when this occurs in the projection.

3,588,257

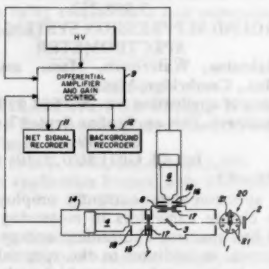
FLAME PHOTOMETRIC METHOD AND APPARATUS FOR QUANTITATIVELY ANALYZING MATERIAL SPECIMENS

Theodore R. Folsom, La Jolla; William E. Weitz, Jr., San Diego, and David A. Tennant, La Jolla, Calif., assignors to the United States of America, as represented by the Secretary of the Navy

Filed Oct. 14, 1968, Ser. No. 767,197

Int. Cl. G01j *3/48*

U.S. Cl. 356—187 **1 Claim**



Cesium specimens in solution are fed into a standard aspirating burner. A pair of photomultipliers monitor the

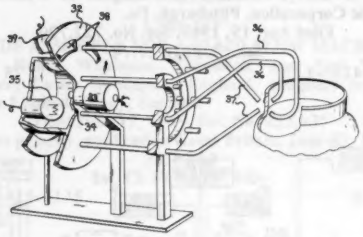
flame radiation of the burner and band-pass filters are used with each photomultiplier to produce signals responsive exclusively to certain wavelengths of the radiation. One filter passes a narrow band of wavelength centered at that of cesium or the specimen being analyzed, while the other filter passes a proximate but separate band. Interposed at an angle to the axis of the beam of light from the flame to one photomultiplier, a plane of glass reflects a predetermined fraction of the beam toward the second photomultiplier. Since the signal from the cesium-responsive photomultiplier is responsive to the intensity of the cesium radiation and since the other photomultiplier is responsive exclusively to a significant and representative fraction of the background radiation, the two signals can be differentiated to provide a quantitative determination of the cesium content of the sample or specimen even when the flame fluctuates.

3,588,258

APPARATUS FOR THE DETECTION OF CHECKS IN GLASS CONTAINERS

Alfred R. Sendt, Gutersloh, Germany, assignor to Owen-Illinois Inc., Toledo, Ohio

Division of Ser. No. 633,764, Apr. 26, 1967, Pat. No. 3,505,526.
Filed Dec. 5, 1969, Ser. No. 882,551
Int. Cl. G01n *21/24;* **G02b** *5/11*
U.S. Cl. 356—240 **1 Claim**



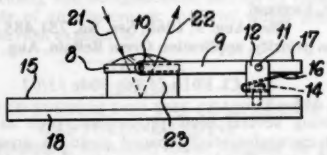
Apparatus for the detection of cracks in objects made of a transparent material, more especially for the inspection of glass containers for their freedom from finish checks. The apparatus is equipped with an illuminating device utilizing a plurality of fiber-optic bundles which illuminate that part of the article which is undergoing inspection from several directions while the article is preferably rotated on its central axis. A receiver, positioned on the opposite side of the wall of the container, will be struck by the reflected light if a crack is present. The receiver may be connected to an ejector which throws out the defective glass container, thus enabling a complete automatic inspection of the glass containers for their freedom from cracks.

3,588,259

SAMPLE HOLDER WITH PIVOTALLY MOUNTED RETAINING MEMBER

Robert J. Harvey, Ramsey, N.J., assignor to Reno A. Del Ben, Tenafly, N.J., fractional part interest

Filed Sept. 19, 1968, Ser. No. 760,876
Int. Cl. G01n *1/28;* **G02b** *21/34*
U.S. Cl. 356—244 **7 Claims**



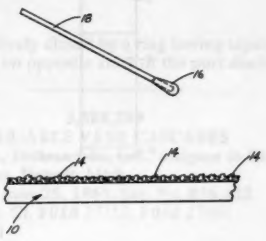
A sample holder for use with a spectrometer, gas chromatograph, optical analyzer, or other analyzing instrument, and comprising a spring loaded arm with a pivotably mounted sample retainer mounted on a base.

3,588,260

CRAYON AND COLOR MEDIA

Shirley A. Caywood, Warsaw, and Clarence L. Neuvirth, Chagrin Falls, Ohio, assignors to Wall Street Dynamics, Inc., Akron, Ohio

Filed May 1, 1969, Ser. No. 821,039
Int. Cl. B43k *19/00;* **B42d** *15/00*
U.S. Cl. 401—49 **4 Claims**



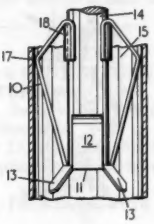
A marker which is harder than most household objects, and hence will not abrade to leave a color mark. Abrasive surface sharp enough to abrade the marker. The surface is filled with a wax which will cause pigment abraded by the sharp surface to be compounded therein as crayon color marking.

3,588,261

WRITING IMPLEMENTS

Lindsay Geoffrey Moojen, Stockport, England (c/o Lloyds Bank Limited, 16-18 Great Underbank)

Filed Sept. 16, 1969, Ser. No. 858,442
Claims priority, application Great Britain, Sept. 17, 1968, 44041/68
Int. Cl. B43k *23/00*
U.S. Cl. 401—92 **8 Claims**



A writing implement having a marking core and a protective tube with a nose cone at one end for guiding the marking core out of the tube, a stop means abutting the end of the core and having prongs engaging in the wall of the tube to resist writing pressure and two pairs of opposed fingers gripping the marking core to centralize same.

3,588,262

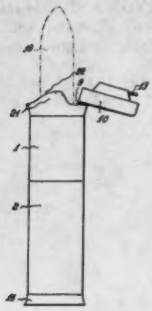
HOUSING FOR ACCOMMODATING A STICK OF COSMETIC MATERIAL, FOR EXAMPLE A LIPSTICK

Josef L. Gabler, Mainaustrasse 44, Zurich, Switzerland

Filed Dec. 6, 1968, Ser. No. 781,879
Claims priority, application Switzerland, Feb. 13, 1968, 2132/68
Int. Cl. A45d *40/06*
U.S. Cl. 401—59 **3 Claims**

A housing for accommodating a stick of cosmetic material, for example a lipstick, is disclosed. The stick can be ad-

vanced and retracted in the axial direction by rotating a rotatable housing part. A pivoted cover flap is provided

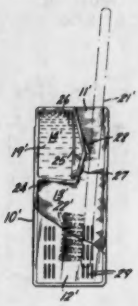


which is opened by spring means and closed by a cam edge on a portion of the rotatable housing part.

3,588,263
BRUSH BOX

Winfried Joseph Werding, 25 Avenue de Chailly 100, Lausanne, Switzerland

Continuation-in-part of application Ser. No. 655,900, July 25, 1967, now abandoned. This application June 23, 1969, Ser. No. 835,341
Int. Cl. A46b *11/00*
U.S. Cl. 401—125 **3 Claims**



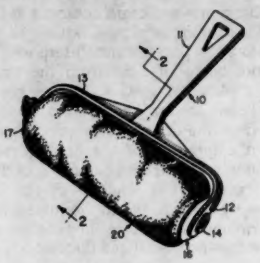
A brush box for storing a brush therein and containing a dispenser for a product to be applied to the brush. The dispenser is automatically actuated by the bristles upon removal of the brush from the brush box and the proper amount of the desired product is applied to the bristles.

3,588,264
PAINT ROLLER

James L. Mallindine, 923 Orange St., Greenville, Mich.

Filed Jan. 13, 1969, Ser. No. 790,555
Int. Cl. B44d *3/28*
U.S. Cl. 401—197 **1 Claim**

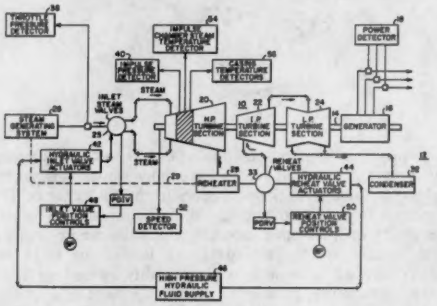
A paint roller with a tubular journal supporting a roller assembly in the fork of a handle, the journal having a fill cap that can be removed to permit filling the interior of the roller assembly with paint. The roller components are held in assembled relationship by the presence of the handle fork, preventing axial separation of these components.



3,588,265
SYSTEM AND METHOD FOR PROVIDING STEAM TURBINE OPERATION WITH IMPROVED DYNAMICS

William R. Berry, Camden, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 19, 1968, Ser. No. 722,790
Int. Cl. F01d *21/14*
U.S. Cl. 415—1 **25 Claims**



A programmed digital computer control system for an electric power plant steam turbine responds to turbine impulse chamber steam temperature and other input variables to control turbine inlet steam flow within constraint limits that prevent excessive rotor loading and allow controlled accumulation of turbine rotor plastic strain fatigue according to predetermined fatigue accumulation standards.

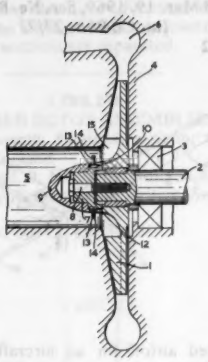
3,588,266
LOW SPECIFIC SPEED ROTARY PUMP

John Lanfear Scott-Scott, Bulkington, and David John Sweetland, Bedworth, England, assignors to Rolls-Royce Limited, Derby, England

Filed Aug. 9, 1968, Ser. No. 751,485
Claims priority, application Great Britain, Aug. 11, 1967, 36981/67
Int. Cl. F01b *25/00*; **F04c** *15/02*
U.S. Cl. 415—11 **10 Claims**

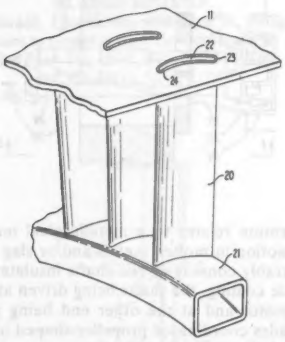
Mounting several bluff projections, such as cylindrical pins, at circumferentially-spaced positions around the impeller of a centrifugal pump upstream of the inlet to the impeller such that when the pump is operated with a low flow inlet angle and at a low suction pressure, each projection will produce a trailing cavity of gas or vapor. The trailing cavities are of helical form and become entwined with each other in

the impeller inlet region and produce a fluid "barrier" which tends to reduce prewhirl conditions by preventing feedback



of liquid from the impeller in an upstream direction and also produces stability of flow through the impeller.

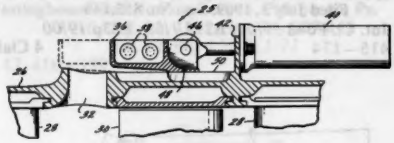
3,588,267
BLADE ASSEMBLY FOR A FLUID FLOW MACHINE
Wilfred Henry Wilkinson, Turnditch, and Paul William Cooper, Castle Donington, England, assignors to Rolls-Royce Limited, Derby, England
Filed June 17, 1969, Ser. No. 833,937
Claims priority, application Great Britain, June 27, 1968, 30787/68
Int. Cl. F1d *5/00, 9/00*
U.S. Cl. 415—135 **6 Claims**



A fluid flow machine has an apertured metallic casing and a hub between which extend aerofoil blades of synthetic resin material, the roots of the blades being mounted in the apertures of the casing and being retained therein by means of a member made of an elastomeric material which allows for differential thermal expansion.

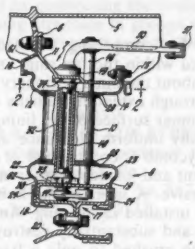
3,588,268
DUMP BLEED SYSTEM FOR THE COMPRESSOR OF A GAS TURBINE ENGINE
Thomas L. Hampton, Loveland, Ohio, assignor to General Electric Company
Filed Sept. 30, 1969, Ser. No. 862,196
Int. Cl. F04d *27/02, 27/00*
U.S. Cl. 415—145 **6 Claims**

A dump bleed system for the compressor of a gas turbine engine. The casing of the axial flow compressor is provided with a circumferential bleed port of unique configuration.



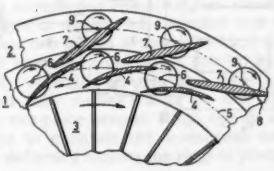
This port is selectively closed by a ring having tapered sealing surfaces engaged on opposite sides of the port discharge.

3,588,269
VARIABLE VANE CASCADES
Earle R. Wall, Jr., Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.
Filed June 25, 1969, Ser. No. 836,422
Int. Cl. F01d *25/12;* **F04d** *27/00*
U.S. Cl. 415—161 **3 Claims**



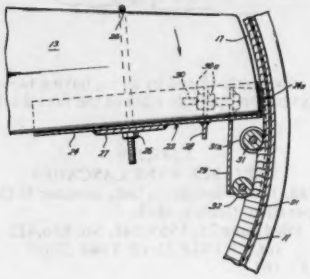
A variable area turbine nozzle ring has a first set of fixed vanes and a second set of vanes which are movable toward and away from the throat of the nozzles between the other sets of vanes so as to vary the outlet area. The second set of vanes may move at both ends or at only one end.

3,588,270
DIFFUSER FOR A CENTRIFUGAL FLUID-FLOW TURBOMACHINE
Albin Boelcs, Zurich, Switzerland, assignor to Escher Wyss Limited, Zurich, Switzerland
Filed July 23, 1969, Ser. No. 844,000
Claims priority, application Switzerland, Aug. 20, 1968, 12486/68
Int. Cl. F01b *25/02;* **F01d** *1/02*
U.S. Cl. 415—162 **4 Claims**



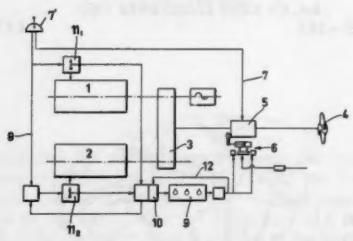
A centrifugal fluid-flow turbomachine has a diffuser provided with two coaxially arranged rows of rotatable guide vanes through which the fluid flows in succession. The pivot axes of the vanes of said two rows are displaceable in relation to one another in the circumferential direction of the rows.

3,588,271
AXIAL FLOW FANS
Eugene M. Davidson, Houston, Tex., assignor to Hudson Products Corporation, Houston, Tex.
Division of Ser. No. 664,819, Aug. 31, 1967, Pat. No. 3,487,519.
Filed July 3, 1969, Ser. No. 852,140
Int. Cl. F04d 19/00; B21d 1/08; B23p 19/00
U.S. Cl. 415—174 4 Claims



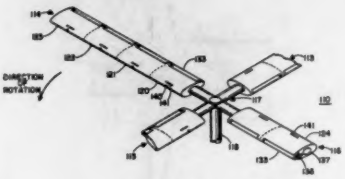
An axial flow fan comprising a rolled fan ring, a blade rotatably mounted within the fan ring, and a lining of metal foil honeycomb about the inner periphery of the ring with the openings therethrough extending radially of the ring. At least a portion of the inner surface of the lining is crushed to provide a substantially uniform clearance about the tip of the blade. The honeycomb is constructed of sheets of the metal foil which are bent and joined together at apaced apart locations by an adhesive. A layer of the honeycomb is first annealed and then installed in the ring. Annealing renders the honeycomb soft and substantially destroys the bond so that the lining may be crushed to only a fraction of its original thickness.

3,588,272
METHOD AND APPARATUS FOR VARIABLE PITCH PROPELLERS
Carl-Axel Lindahl, Kristinehamn; Bengt Ludvig Ohlsen, and Lars Ake Valdemar Hjort, Nynashamn, Sweden, assignors to Aktiebolaget Karlstads Mekaniska Werkstad, Karlstad, Sweden
Filed Aug. 19, 1969, Ser. No. 851,339
Claims priority, application Sweden, Aug. 21, 1968, 11231/68
Int. Cl. B63h 3/10
U.S. Cl. 416—1 15 Claims



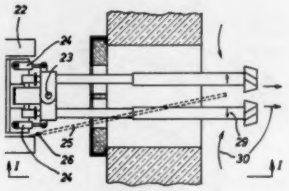
The load on the engine of a ship is maintained within prescribed limits by making an adjustment of the propeller of the ship to compensate for changes in wind and sea conditions and the like. This is accomplished by generating a corrective signal, depending on the discrepancy that may exist between actual and desired engine load. The corrective signal, in the form of a train of pulses, controls a servomechanism that adjusts propeller pitch.

3,588,273
CONTROL APPARATUS
Apostolos P. Kizilos, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Mar. 19, 1969, Ser. No. 808,490
Int. Cl. B64c 27/72
U.S. Cl. 416—42 10 Claims



A sectionalized airfoil for an aircraft, each section of which includes local airflow sensors, control means, and jet flap means for controlling the lift produced by the section. The present invention has particular application to rotary-wing aircraft wherein each rotor blade section may include variable deflection thruster jet flap means operable to control the lift produced by each section.

3,588,274
METALLURGICAL MANIPULATOR
Sven Erik Malte Norlindh, Smedjebacken, Sweden, assignor to AB Inva, Smedjebacken, Sweden
Filed Dec. 27, 1968, Ser. No. 787,467
Claims priority, application Sweden, Dec. 29, 1967, 18018/67
Int. Cl. F01d 5/28
U.S. Cl. 416—63 2 Claims



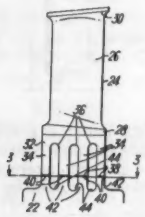
This invention relates to a metallurgical manipulator for achieving motion in molten metals and/or slag. The manipulator preferrably consists of two shafts insulated against heat by a ceramic coating, the shafts being driven at one end by a hydraulic motor and at the other end being provided with ceramic blades coordinated propeller-shaped or parallel with the shaft, rotating towards each other.

3,588,275
COCKTAIL ACCESSORY
Gian Carlo Frassoldati, 57 Manchester Place, Goleta, Calif.
Filed Sept. 22, 1969, Ser. No. 859,917
Int. Cl. A47j 43/27
U.S. Cl. 416—71 3 Claims

A cocktail accessory having a first function such as for stirring a cocktail comprising a first and second section. The first function can be accomplished only when both sections are joined at a fracture section. and the first section has a

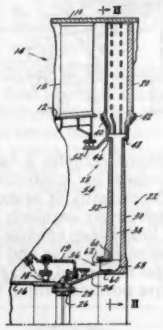
second function which can be obtained only be breaking of the device at the fracture section which concurrently destroys the function of the assembled device so that it cannot be reused for its originally intended purpose. If desired, the second section may also have a function which can be accomplished while the device is unitary joined and which is destroyed when the sections are separated.

3,588,276
BLADED ROTOR ASSEMBLIES
Albert Jubb, Kenilworth, England, assignor to Rolls Royce Limited, Derby, England
Filed Sept. 9, 1969, Ser. No. 856,425
Claims priority, application Great Britain, Sept. 17, 1968, 44131/68
Int. Cl. F01d *5/08*
U.S. Cl. 416—95 **10 Claims**



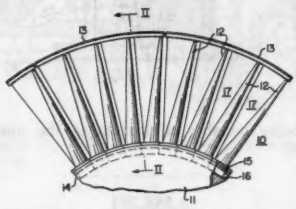
The invention resides in a gas turbine engine bladed rotor assembly in which the blades have roots comprising at least four identical prongs which are arranged in a rectangular pattern and which are welded to a similar set of shorter prongs extending radially outwardly from the rotor, thus providing a flexible blade mounting and reducing heat transfer to the rotor.

3,588,277
BLADED ROTORS
Werner E. Howald, Cincinnati, and Jack D. Wright, Mason, Ohio, assignors to General Electric Comapny
Filed May 16, 1966, Ser. No. 551,190
Int. Cl. F01d *5/08, 5/18*
U.S. Cl. 416—96 **6 Claims**



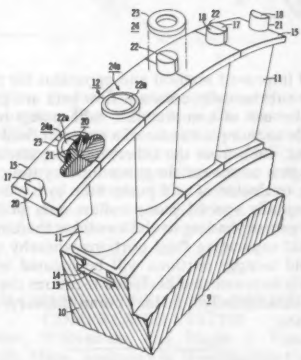
A rotor comprising two axially spaced discs, a plurality of radially extending vanes between the discs which join the discs together; preferably the vanes extend beyond the disc as lugs which define guideways for receiving blades, whereby the radial force of the rotating blades is transmitted in tension to the vanes and then as a shear loading into the discs over a relatively large area. It is also preferable that one of the discs be annular so that cooling air can enter at the inner periphery and be impelled through the passageways defined by the vanes and then enter the blades through holes in the bases of the tangs.

3,588,278
BLADE STRUCTURE FOR AN AXIAL FLOW ELASTIC FLUID UTILIZING MACHINE
Ralph J. Ortolano, Saratoga; William P. Welch, Sunnyvale, and Harold W. Semar, Los Altos, Calif., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Mar. 21, 1969, Ser. No. 809,242
Int. Cl. F01d *5/10, 5/22*
U.S. Cl. 416—190 **4 Claims**



The invention provides an improved bladed rotor structure for an axial flow turbine, or the like, operable at constant or variable speed within a speed range extending to maximum rated speed, wherein the vibratory stress at resonant speeds is substantially reduced by connecting the blades to each other, as by shroud or lashing structure in groups equal in number to the resonant harmonic frequency of tee blades divided by the resonant speed.

3,588,279
SHROUDED ROTOR BLADE STRUCTURE
Ralph E. McGinnis, Folsom, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Sept. 15, 1969, Ser. No. 857,946
Int. Cl. F01d *5/22*
U.S. Cl. 416—191 **10 Claims**

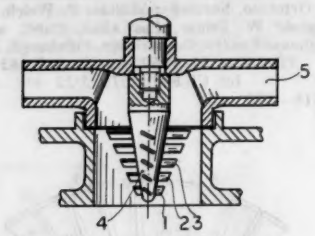


A shrouded rotor blade structure for an elastic fluid axial flow turbine or compressor comprising an annular series of segments arranged in end-to-end abutment with each other. Each segment has two tenons of semicylindrical shape, which hereinafter will be called semitenons, one on each end, extending radially outward wherein the flat faces of the semitenons abut their mating halves on the adjacent segments forming two-piece tenons. Rings tightly encircle the tenon structures to maintain the semitenons in abutment. The tenons are deformed locking the rings in place.

3,588,280
INDUCERS FOR CENTRIFUGAL PUMPS
Shmariahu Yedidiah, 89 Oakridge Road, West Orange, N.J.
Filed Aug. 19, 1969, Ser. No. 851,201
Int. Cl. F04d *19/02*; **F01d** *1/12*; **F04d** *29/18*
U.S. Cl. 416—200 **12 Claims**

A centrifugal pump inducer composed of a number of

blade sets with consecutively increasing diameters, each set



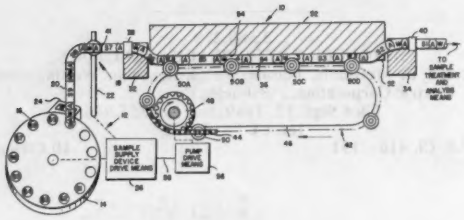
of blades being capable of increasing the energy of the pumped fluid.

3,588,281

METHOD AND APPARATUS FOR THE PUMPING OF FLUIDS AT SUBSTANTIALLY CONSTANT FLOW RATE

Jack Isreeli, Mamaroneck, and Aaron Kassel, Brooklyn, N.Y., assignors to Technicon Corporation, Tarrytown, N.Y.

Filed July 24, 1969, Ser. No. 844,545
Int. Cl. F04b *51/00*
U.S. Cl. 417—53 **13 Claims**



New and improved method and apparatus for the pumping of fluids at substantially constant flow rate are provided and comprise the use of compressible tube pump means which are operable to pump a stream of a series of fluid sample portions spaced, each from the other, by a separating fluid portion, through a compressible pump tube by the concomitant, progressive occlusion of said pump tube by a plurality of substantially equally spaced pump rollers only at locations on the former corresponding to the locations therein of some, at least, of said separating fluid portions whereby one or more of said fluid sample portions will be located in said pump tube entirely between said occluded locations thereon to provide for a substantially constant pump delivery, sample portion flow rate.

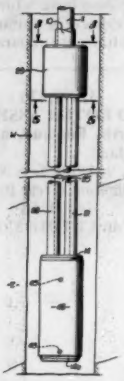
3,588,282

FLUID SHOCK WAVE OSCILLATOR AND FLUIDIC PUMP

David V. Chenoweth, Houston, Tex., assignor to Baker Oil Tools, Inc., Commerce, Calif.

Filed Mar. 26, 1969, Ser. No. 810,536
Int. Cl. F04f *7/00*
U.S. Cl. 417—65 **10 Claims**

A shock wave oscillator, such as a pump or pressure booster, in which fluid is pumped between a shock passage and a second fluid passage, there being a valve between the passages opening and closing at a comparatively rapid frequency, the valve in each cycle of its operation being closed suddenly by the pumped fluid so as to create a travelling fluid pressure rarefaction wave in the shock passage that develops either a positive or negative pressure pulse in the shock passage and thereby either increases or decreases the pressure in the shock passage over a time period equal to twice the length of the shock passage divided by the sonic pressure wave celerity in the field medium being pumped, the travelling pressure wave effecting reopening of the valve at the end of the time period, the cycle of operation repeating automatically. Two shock passages or tubes inter-



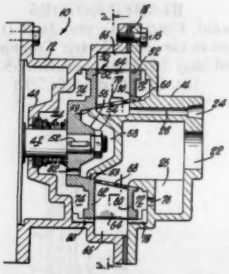
communicating at one end are preferably used, with the valve alternately closing the flow between the second passage in each shock passage and then alternately opening to permit such flow, thereby obtaining continuity in fluid flow.

3,588,283

VACUUM PUMP OR COMPRESSOR

James B. Fitch, Stratford, Conn., assignor to Nash Engineering Company, Norwalk, Conn.

Continuation of application Ser. No. 730,131, May 17, 1966, now abandoned. This application Oct. 27, 1969, Ser. No. 869,963
Int. Cl. F04c *19/00*
U.S. Cl. 417—68 **8 Claims**



The present invention includes a vacuum pump wherein passageways are formed for controlling a predetermined shroud pressure independently of assembly clearances. This invention includes selectively angularly locating passageways between peripheral lobe sweep chambers and rotor end face chambers, and between said rotor end face chambers and a rotor hub. Internal gas and liquid leakage due to pressure differentials in respective positions within the pump assembly is minimized.

3,588,284

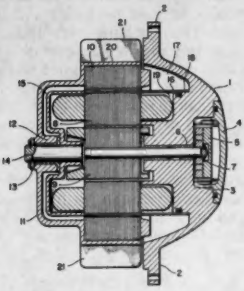
MOTOR WITH PUMP AND BLOWER FOR OIL BURNERS

Leif V. Sturlason, Sonderborg, and Kyrre G. Sjotun, Langeso PR. Nordborg, Denmark, assignors to Danfoss A/S, Nordborg, Denmark

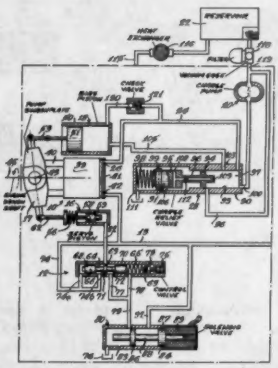
Filed May 26, 1969, Ser. No. 827,604
Claims priority, application Germany, May 21, 1968, P 17 51 388.1
Int. Cl. F04b *13/02*; **F04d** *25/06*
U.S. Cl. 417—201 **3 Claims**

The invention relates to a motorized pump and blower assembly for oil burners. The motor rotor is divided into two

parts with one rotor part for driving the pump being internally of the stator and the other rotor part for driving the blower being externally of the stator. The assembly housing is provided with bearing and journal means on opposite sides of the stator for rotatably supporting the two rotor parts.



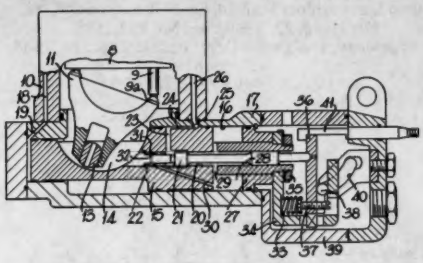
3,588,285
HYDRAULIC PUMP
Harry C. Moon, Jr., Ogelsby, Ill., assignor to Sunstrand Corporation
Filed Oct. 21, 1968, Ser. No. 769,063
Int. Cl. F04b *23/12, 49/00, 23/14*
U.S. Cl. 417—202 **10 Claims**



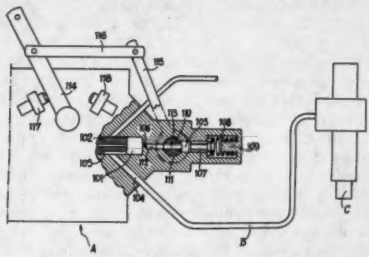
A variable displacement hydraulic pump of the multiple piston type having a fluid operable biasing piston for biasing the pump toward maximum displacement, a control valve for controlling the fluid pressure in a displacement control motor opposing the biasing piston, and a charge relief valve that operates on a priority basis in the low pressure side of the hydraulic circuit in conjunction with a charge pump to sequentially (1) supply fluid to the low pressure side of the main pump in open circuit, (2) supply hydraulic fluid to the biasing piston, (3) supply cooling oil for the rotating components of the pump, and (4) provide a bypass relief directly to the inlet of the charge pump.

3,588,286
CONTROL SYSTEMS FOR HYDRAULIC PUMPS
Robert T. J. Skinner, Kenilworth, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England
Filed June 20, 1969, Ser. No. 835,055
Int. Cl. F04b *49/00;* **F15b** *13/102*
U.S. Cl. 417—218 **3 Claims**

A control system for an hydraulic positive displacement-type pump comprising a piston in a cylinder, the piston being connected to the swashplate of the pump, a spool in a bore in the piston and passage means whereby fluid can reach opposite ends of the piston to cause it to move to control the inclination of the pump swashplate, the position of the spool controlling the flow through the passages, and a spring acting between the piston and the spool and means including system of rollers and slots for varying the force exerted by the spring upon the spool in accordance with the position of the piston in the cylinder.

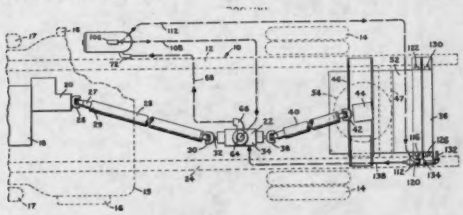


3,588,287
FUEL INJECTION DEVICE FOR A COMPRESSION-IGNITED INTERNAL COMBUSTION ENGINE
Jean Moulin, Chatou, France, assignor to Automobiles Peugeot, Paris, France
Filed Feb. 25, 1969, Ser. No. 801,961
Claims priority, application France, Mar. 5, 1968, 142354
Int. Cl. F04b *49/00;* **F01b** *31/14;* **F22b** *7/00*
U.S. Cl. 417—275 **9 Claims**



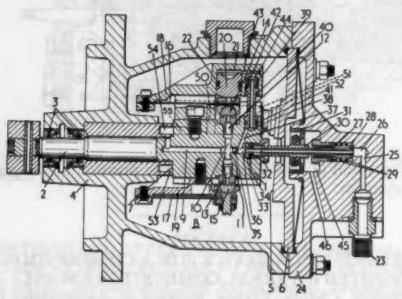
Fuel injection device for a compression-ignited internal combustion engine. The device is in the form of a takeoff device modifying the law and duration of the injection. An adjustable closing element acting as cancelling means is located in a passageway having a constriction and connecting the takeoff chamber of the device to the injection pump. The position closing element is controlled by a parameter which is a function of a condition of operation of the engine.

3,588,288
UNDER CHASSIS POWER TAKE-OFF DRIVEN COMPRESSOR SYSTEM
Olin E. Potter, Wilbraham, and Biagio J. Tomasi, South Hadley Falls, Mass., assignors to Worthington Corporation, Harrison, N.J.
Filed Mar. 21, 1969, Ser. No. 809,187
Int. Cl. F02b *71/06*
U.S. Cl. 417—234 **5 Claims**



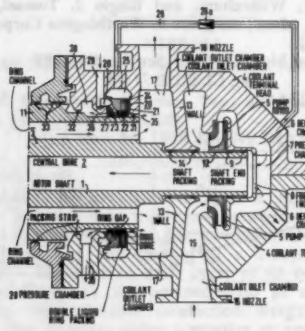
A vehicle mounted compressor system driven by the vehicle engine. The compressor system has a separate cooling assembly driven directly by the compressor and independent of the cooling system for the vehicle engine.

3,588,289
ROTARY FUEL PUMP
Mark Cary Sedgwick Barnard, Solihull, England, assignor to Leyland Gas Turbines Limited, Solihull, England
Filed Aug. 22, 1969, Ser. No. 852,250
Claims priority, application Great Britain, Sept. 22, 1968, 45759/68
Int. Cl. F04b *49/00, 27/08*
U.S. Cl. 417—294 **2 Claims**



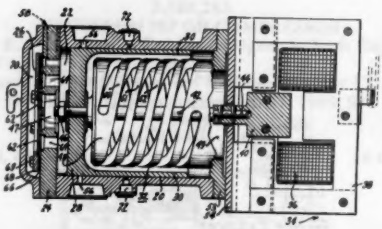
A rotary fuel pump of the kind in which a rotor having a plurality of axially-extending bores therein, each containing a piston engageable with a cam-plate inclined to the axis of rotation of the rotor and communicating with a port at the end thereof remote from the cam-plate, whereby on rotation of the rotor, the ports will be carried in succession past a fuel inlet and a fuel outlet aperture and the pistons will be reciprocated to effect pumping and in which there is a centrifugally operable spill valve carried by the rotor and operable to control flow through a spill passage in the rotor leading from the outlet aperture to a sump communicating with the inlet aperture. In such a pump it is known to apply variable controlling force on the centrifugally operable spill valve. The present invention provides a pair of concentric, relatively rotatable, tubular quill shafts, of which one is carried by the rotor and communicates with a piston carried by the rotor and engageable with the spill valve and the other extends through a wall of the housing of the pump to receive an external controlling pressure signal. An annular clearance space between the concentric quill shafts communicates with a leakage path for fluid providing the pressure signal.

3,588,290
COOLING SYSTEM FOR SUPPLYING LIQUID COOLANT TO WINDINGS OF AN ELECTRICAL MACHINE
Franz Kreutzkampf, Aachen, Germany, assignor to Simens Aktiengellschaft, Berlin and Munich, Germany
Filed Dec. 29, 1969, Ser. No. 888,486
Int. Cl. H02k *9/19*
U.S. Cl. 417—370 **11 Claims**



A stationary coolant terminal head is provided at the end of the rotor shaft of an electrical machine and covers such end as a housing. An annular ring channel is provided around part of the shaft having an axial bore formed therethrough. A coolant inlet chamber and a coolant outlet chamber are provided in the terminal head adjacent each other and are connected to the axial bore of the shaft. An intermediate wall portion separates the coolant inlet and outlet chambers. Shaft packing at the intermediate wall portion seals and separates the coolant inlet and outlet chambers from each other. A front face inlet to the axial bore of the shaft is provided in the terminal head. A deflection channel is provided in the terminal head between the coolant inlet chamber and the front face inlet. A pump in the terminal head supplied coolant from the coolant inlet chamber to the axial bore of the shaft in a direction opposite the predetermined direction in which coolant flows through the axial bore via the deflection channel and the front face inlet. The pump is on the side of the coolant inlet chamber opposite that of the coolant outlet chamber.

3,588,291
RESONANT PISTON PUMPS
Peter W. Curwen, Ballston Spa, and Richard V. Newell, Loudonville, N.Y., assignors to Mechanical Technology Incorporated, Latham, N.Y.
Filed Dec. 5, 1969, Ser. No. 882,446
Int. Cl. F04b *35/04, 21/02*
U.S. Cl. 417—417 **14 Claims**

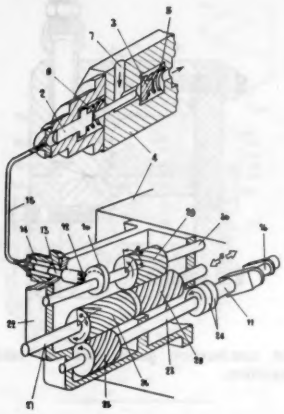


A resonant piston pump wherein spring means are provided which are secured at one end to the pump housing and at the other end to the pump piston and being operatively arranged and associated with such piston and housing to provide for substantially parallel movement of the piston within but out of contact with the pump cylinder during alternate compression and expansion of the spring means. The piston is driven by an electromagnetic drive means in a resonant mode of vibration with the spring means to provide for maximum power transfer and efficiency of the pump.

3,588,292
DEVICE FOR REGULATING, BY REFLUX THROUGH THE INLET-VALVE, THE SUCKED FLOW FOR RECIPROCATING COMPRESSORS
Costantino Vinciguerra, Firenze, Italy, assignor to Nuovo Pignone S.P.A., Firenze, Italy
Filed Apr. 10, 1969, Ser. No. 815,171
Claims priority, application Italy, Nov. 15, 1968, 829175
Int. Cl. F04b *39/08*
U.S. Cl. 417—446 **5 Claims**

The delivery of a compressor is continuously and precisely controlled, even during operation, by a mechanical drive regulating the reflux through the inlet valve, in which the motion of the compressor crank shaft is transmitted by means of helicoidally toothed gears through an intermediate gear shaft to a cam shaft on which there is keyed a cam which drives additional mechanism controlling the flow through the inlet valve to the compression cylinder. The relative position of the driving cam and the crank shaft directly determines the duration of the reflux period, and is regulated by axially shifting the intermediate gear shaft. Additional stages of a

multistage compressor may also be independently controlled by adding an axially movable shaft and a cam shaft for each



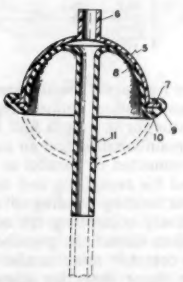
additional stage in meshing engagement with the cam shaft of the next previous gear train.

3,588,293

CONCAVO-CONVEX SIPHONING PUMP

Juan Alberto Morales, 160 Ave. Adolphe Buyl, Brussels 5, Belgium

Filed Nov. 25, 1969, Ser. No. 879,827
Int. Cl. F04b *43/00*; F16l *43/00*
U.S. Cl. 417—479 **3 Claims**



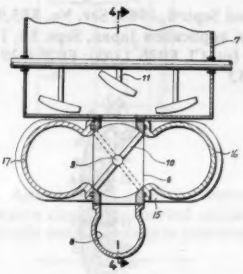
A siphoning pump having a semispherical rigid plastic cup with a circular exterior flange at its open end. A nipple on the cup extends exteriorly and a flexible hose has one end attached thereto. A concavo-convex rubber diaphragm has a marginal edge portion attached to the flange and the concavo-convex body portion extends into the cup with its convex bottom side depending into the upper portion of the cup and the concave side facing outwardly. The central portion of the concave side has a vertically elongated nipplelike fingergripping pull to be bodily lifted up with the fingers to invert the diaphragm, and then released to permit the diaphragm to be returned to its normal starting position within the confines of the cup. The hose has a length to permit a container to be placed on the ground at a level below the level of a tank from which liquid is to be siphoned. A socket and groove are formed in the diaphragm at the marginal edge portion.

3,588,294

SLURRY PUMP ARRANGEMENT

Karl Schlecht, Bernhausen, Germany, assignor to Putzmeister G.m.b.H., Chur, Switzerland

Filed Apr. 15, 1969, Ser. No. 816,343
Claims priority, application Germany, Apr. 19, 1968, 1,703,219
Int. Cl. F04b *7/00*
U.S. Cl. 417—532 **13 Claims**



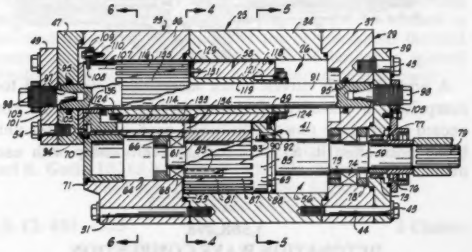
A reciprocating duplex slurry pump is equipped with a four-way valve for alternatingly feeding concrete mixture to two cylinders arranged in a common horizontal plane whose pistons operate in phase opposition, and for discharging the mixture under pressure. The valve housing which connects the open front ends of the cylinders includes a central valve body connected with the cylinder ends by pivotally mounted wide and short elbows. Concrete mixture enters the valve body from above and is discharged downwardly as directed by a valve plate pivotally mounted in the valve body. The valve arrangement permits the pump elements to be mounted closely adjacent each other to shorten the path of concrete mixture and to minimize clogging by hardening concrete.

3,588,295

VARIABLE OUTPUT GEAR PUMP OR MOTOR APPARATUS

Lowell E. Burk, Box 86, Oakley, Kans.

Filed Aug. 29, 1969, Ser. No. 854,122
Int. Cl. F01c *21/16*
U.S. Cl. 418—21 **5 Claims**



This invention relates to variable capacity rotary hydraulic pump and/or motor apparatus of the kind comprising, more particularly, a pump having a variable discharge that will operate at a constant speed or a variable speed motor driven by a constant volume of fluid. More particularly, this invention relates to a hydraulic pump or motor having rotating, engaging teeth members movable axially relative to each other within respective sleeve portions to expose variable meshing teeth areas to provide the efficient and effective variable output apparatus of this invention. Additionally, this invention relates to variable output apparatus having a control valve operably connected to opposite sides of the meshing gear teeth members so as to automatically maintain a given ad-

justed position and operable to readily move the teeth members relative to each other when desired with said of the operating fluid pressure.

3,588,296

CENTER HOUSING FOR A ROTARY PISTON ENGINE

Yoji Toyama, and Yutaka Hirose, Aki-Gun, Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Hiroshima-Ken, Japan

Filed Sept. 8, 1969, Ser. No. 855,963
Claims priority, application Japan, Sept. 10, 1968, 43/65408
Int. Cl. F02b *53/00;* **F02f** *1/20*
U.S. Cl. 418—83 **3 Claims**

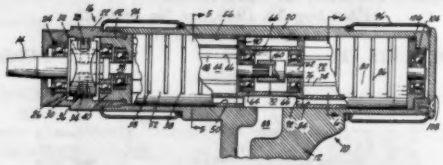
The center housing of a rotary piston engine has spaced inner and outer wall portions facilitating axial flow of cooling fluid and has some of the bolt bosses and ribs which normally connect the wall portions are integrally formed with the outer wall portion but unconnected to the inner wall portion so that the inner wall portion adjacent to the ignition plug receiving hole is relatively flexible.

3,588,297

TANDEM MOTOR ASSEMBLY

Woodford J. Crump, South Gate, Calif., assignor to Monogram Industries, Inc., Los Angeles, Calif.

Filed Sept. 26, 1968, Ser. No. 762,745
Int. Cl. F01c *11/00*
U.S. Cl. 418—212 **3 Claims**



A pneumatically driven motor assembly to operate a tool comprising a plurality of spaced in-line motor units connected to produce power additively, each of the motor units being positioned in an out-of-phase relationship with each other.

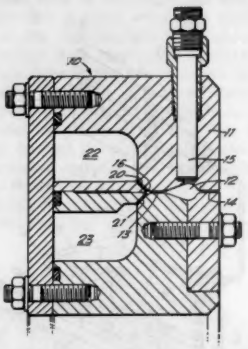
3,588,298

DETONATION WAVE COMBUSTION

Brian Draycott Edwards, Derby, England, assignor to Rolls-Royce Limited, Derby, England

Filed June 10, 1969, Ser. No. 831,928
Claims priority, application Great Britain, June 14, 1968, 28389/68
Int. Cl. F23c *3/02*
U.S. Cl. 431—1 **10 Claims**

The invention concerns a method of producing combustion gases comprising producing at least one continuously moving combustion-initiating detonation wave in an annular combustion chamber, and successively axially directing through at least one region of the combustion chamber, between the passage of successive waves therepast, a supply of a gaseous oxidant followed by a supply of a detonatable mixture of the gaseous oxidant and of a fuel which is oxidizable thereby, the supply of the gaseous oxidant acting as a barrier layer



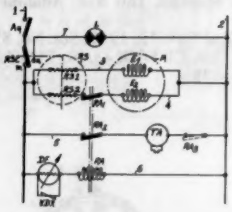
between the combustion gases and the said mixture to prevent preignition.

3,588,299

FUEL-OIL BURNER CONTROL SYSTEM

Joseph Callet, Grenoble, France, assignor to Appareillage Thermoflex, Etablissements J. M. Dard, Grenoble, France

Filed Apr. 8, 1969, Ser. No. 814,346
Claims priority, application France, Apr. 24, 1968, Aug. 9, 1968, Jan. 17, 1969, 149,272;162,433;69,00717
Int. Cl. F23n *5/20*
U.S. Cl. 431—78 **6 Claims**



A control device for burner installations including a burner which comprises an electrical ignition apparatus and a single-phase electric motor for driving a fuel feed apparatus. The motor includes a main winding and an auxiliary starter winding, operatively connected in parallel to each other. A main contact is provided for energizing and deenergizing the control device. A first heating winding of a safety relay is arranged for operatively controlling the main contact. An apparatus is adapted to detect the presence of a flame at the burner. A flame detector relay is also provided, which is responsive to the flame detecting apparatus. An auxiliary contact is responsive to the flame detector relay and is connected operatively to the auxiliary starter winding. The latter is disposed such, as to be energized through the auxiliary contact when starting the installation and also through a first heating winding of a safety relay. The safety relay comprises a second heating winding disposed in a circuit branch containing the main winding of the motor. Also the flame detector relay controls operatively the electrical ignition apparatus.

3,588,300

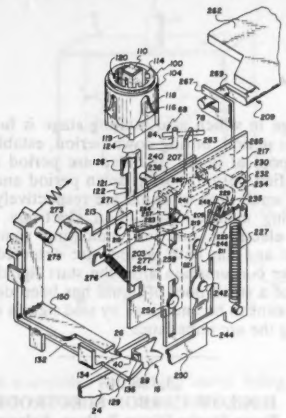
FIRING MECHANISM FOR PERCUSSIVELY IGNITABLE FLASHLAMPS

Edward Louis Sturm, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 14, 1969, Ser. No. 850,125
Int. Cl. F21k *5/02*
U.S. Cl. 431—93 **11 Claims**

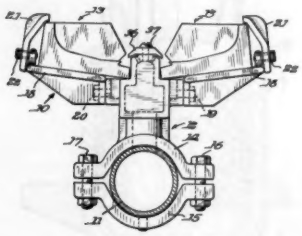
A sensing and firing mechanism for use with percussively ignitable flashlamps, in a multilamp unit or flashcube, in-

cludes a camming device for temporarily withdrawing a sensing and actuating member from the unit upon rotation of the unit. The sensing and actuating member is movable into



the unit to sequentially sense the condition of and to fire successive flashlamps in the unit, and the camming device includes a cam on a unit-receiving socket to cam the arm out of the unit when the socket is rotated.

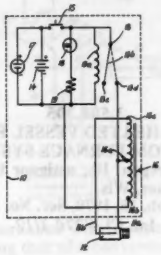
3,588,301
RADIANT HEAT GENERATING BURNER
George B. Brenneman, and William P. Coppin, Jr., Muncie, Ind., assignors to Maxon Premix Burner Company, Inc., Muncie, Ind.
Filed Feb. 25, 1970, Ser. No. 14,156
Int. Cl. F23d *13/12*
U.S. Cl. 431—348 **7 Claims**



A new and improved radiant heat generating burner having a fuel discharge assembly equipped with a deflecting plate to downwardly direct a flow of fuel and a radiant heat generating refractory material made up of a curved upper section, which carries a plurality of parallel spaced flanges, and a lower base section terminating in a knifelike edge opposite the downwardly directed flow of fuel, is provided for use in dividing a fuel stream so that the major portion of fuel passes onto the refractory material and the minor portion of fuel recirculates back to the fuel discharge point.

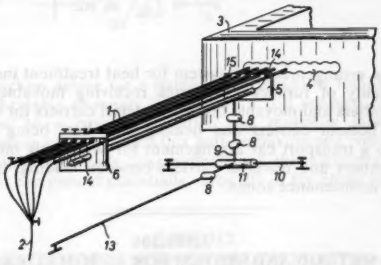
3,588,302
ELECTRICALLY-OPERATED IGNITER
Alton G. Herlan, Cheektowaga, N.Y., assignor to Robert J. Barry, Tonawanda, N.Y., fractional part interest
Filed June 2, 1969, Ser. No. 829,367
Int. Cl. F23q *3/01*
U.S. Cl. 431—254 **11 Claims**

An electrically operated igniter for gas and other flammable mixtures comprising a controlled switch in the form of a relay which, upon closing, connects a source of direct current in the form of a battery to an autotransformer. The battery can be connected to the relay control winding in a manner such that a square wave or pulsating DC voltage appears on the output of the autotransformer which is connected to arc-initiating electrodes included in an element which is constructed so as to trap or collect a small, ignitable



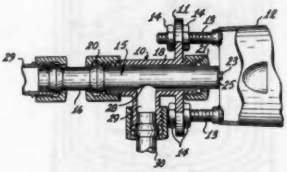
quantity of gas. Alternatively, a second battery and series-connected resistance can be connected across the first battery whereby a single output voltage is provided.

3,588,303
APPARATUS FOR HOLDING THERMAL LANCES
August Karrer, Wetzikon, Switzerland
Filed Feb. 28, 1969, Ser. No. 803,277
Claims priority, application Switzerland, Mar. 1, 1968, 3076/68
Int. Cl. F23d *13/24*
U.S. Cl. 431—343 **9 Claims**



Disclosed herein is an apparatus for holding a plurality of self-consuming thermal lances for simultaneously burning openings in building walls or the like. Further a method is disclosed according to which the set of consumed thermal lances is removed and the fresh set of lances is ignited directly at the hot material in which an opening is to burn.

3,588,304
GAS AND LIQUID FUEL BURNER
Carl R. Guth, 10215 N. 38th St., Phoenix, Ariz.
Filed Jan. 23, 1970, Ser. No. 5,232
Int. Cl. F23d *15/02*
U.S. Cl. 431—353 **2 Claims**



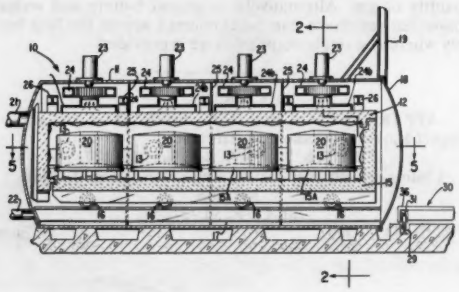
A nozzle for a fuel burner utilizing air asperation to draw the fuel from the nozzle tip and mix with the fuel in a highly efficient manner while providing a simple construction utilizing conventional pipe fittings to construct the device.

ELECTRICAL

3,588,305
ELECTRICALLY HEATED VESSEL ENCLOSED CAR BOTTOM FURNACE SYSTEM

Karl H. Seelandt, Oregon, Ill., assignor to Sola Basic Industries, Inc., Milwaukee, Wis.

Filed Feb. 18, 1970, Ser. No. 12,290
Int. Cl. F27d *3/12*
U.S. Cl. 13—1 **14 Claims**

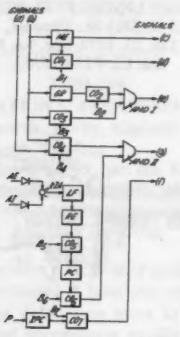


An arrangement and system for heat treatment including a plurality of furnace enclosures receiving movable heating chambers and movable bottom material carriers for each, the car bottom carriers and heating chambers being movable onto a transport car arrangement for selectively moving the chambers and material carriers between loading, unloading and maintenance zones.

3,588,306
METHOD AND SYSTEM FOR AUTOMATICALLY DETECTING AND CONTROLLING FURNACE OPERATING CONDITION OF ARC-FURNACE AT CHARGE MELTING STAGE

Morihiko Kawabe, Yokohama-shi, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo-to, Japan

Filed Dec. 8, 1969, Ser. No. 883,003
Claims priority, application Japan, Feb. 20, 1969, 44/12863
Int. Cl. H05b *1/02, 7/00*
U.S. Cl. 13—13 **2 Claims**

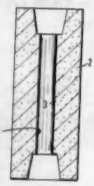


A system for automatically detecting and controlling the furnace operating condition of an arc-furnace at the charge melting stage in which said melting stage is further divided into the first period, boring down period, establishing period of a small pool of liquid, shielded arc period and flat bath period; the first period, boring down period and establishing period of a small pool of liquid are respectively detected by first detecting means based upon electrode position and lowermost electrode position indicating signals; and the shielded arc and flat bath periods are detected respectively by the power consumption after the start signal of establishing period of a small pool of liquid has been derived and by detecting means to be energized by said signals and the signal representing the arc impedance.

3,588,307
HOLLOW CARBON ELECTRODE

Kurt Kegel, Essen-Steele; Dieter Zollner, Erlangen; Bernhard Reichelt, Nurnberg-Laufamholz, and Konrad Koziol, Rothenbach an der Pegnitz, Germany, assignors to C. Conradty, Nurnberg, Germany

Filed May 19, 1969, Ser. No. 833,841
Claims priority, application Germany, May 24, 1968, P-17-58394.7
Int. Cl. H05b *7/06*
U.S. Cl. 13—18 **11 Claims**



A hollow electrode with a longitudinal passage therethrough which consists of carbon material and in which the surface of the passage is made substantially gas-impermeable.

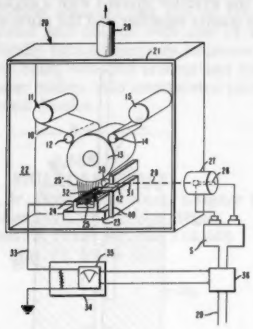
3,588,308
METHOD OF AND APPARATUS FOR VACUUM METALLIZING

John T. Carleton, Williamsville, N.Y., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed June 17, 1969, Ser. No. 833,961
Int. Cl. H05b *7/00*
U.S. Cl. 13—31 **7 Claims**

Vacuum metallizing apparatus wherein the target metal is contained in a crucible in a vacuum chamber and is vaporized by impinging a deflected beam of high energy electrons onto the target metal including means to sense the change in current caused in a circuit of which the crucible is a part whenever the deflected electron beam strays from the target metal or crucible and means to shut off the electron beam to prevent damage to other elements within the vacuum chamber whenever the electron beam strays from the target metal.

Method of shutting off a deflected electron beam if it strays from a crucible containing metal being vaporized by the beam in a vacuum metallizing apparatus.

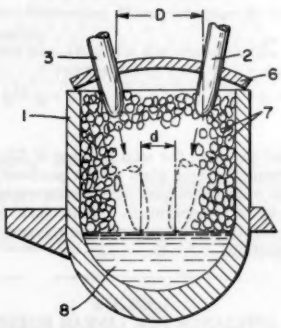


3,588,309

HEATING METHOD FOR DIRECT-ARC FURNACE

Shozo Yasukawa, Kanagawa-ken, and Masayuki Aoshika, Saitama-ken, Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo-to, Japan

Filed June 26, 1969, Ser. No. 836,798
Int. Cl. H05b *3/60, 7/10*
U.S. Cl. 13—34 3 Claims



Heating method for direct arc furnaces. At an initial stage of melting the furnace charge, the tips of the electrodes are spaced apart by relatively long distances. As the melting is advanced, this spacing is gradually reduced, while the electrodes are lowered.

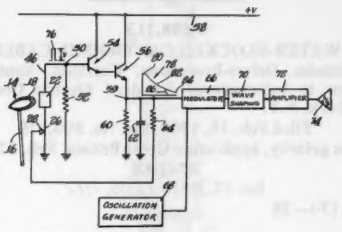
3,588,310

PIANO TONE SIMULATION SYSTEM WITH PIEZOELECTRIC GENERATOR

Eric Gschwandtner, North Tonawanda, N.Y., assignor to The Wurlitzer Company, Chicago, Ill.

Filed Mar. 26, 1969, Ser. No. 818,179
Int. Cl. G10h *1/02, 3/00*
U.S. Cl. 84—1.13 12 Claims

A piano action including a hammer having a felt head, the hammer striking a piezoelectric generator which generates a DC electric potential proportional to the force of the hammer blow. The potential generated momentarily turns on a transistor to charge a capacitor. The capacitor then discharges in accordance with a resistor to provide a wave envelope simulating that of a conventional piano.

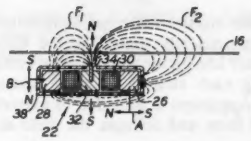


3,588,311

BI-DIRECTIONAL ELECTROMAGNETIC PICK-UP DEVICE FOR STRINGED MUSICAL INSTRUMENTS

Attila C. Zoller, 69-01-35th Ave., Woodside, N.Y.

Filed Jan. 16, 1969, Ser. No. 791,640
Int. Cl. G10h *3/08*
U.S. Cl. 84—1.15 12 Claims



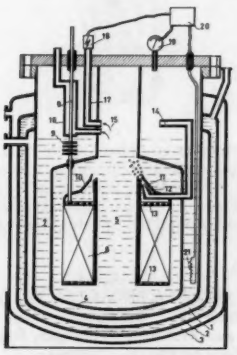
A pickup device for a stringed instrument or the like having vibratable elements, comprising a coil adapted for connection to a current amplifier and magnetic means for generating a bidirectional flux pattern having one component extending essentially longitudinally of the elements and a second component essentially vertically of the elements.

3,588,312

METHOD AND DEVICE FOR CIRCULATING A CRYOGENIC LIQUID WITHIN A BODY IMMERSED IN THE CRYOGENIC LIQUID

Pierre Burnier, Saint Julien en Genevois, France, assignor to Societe Generale de Constructions Electriques et Mecaniques, Paris, France

Filed Aug. 26, 1969, Ser. No. 853,178
Int. Cl. G21c *15/02*
U.S. Cl. 174—15 10 Claims



Gasified cryogenic liquid is collected at the top of the cryostat and injected by a nozzle for equivalent into the

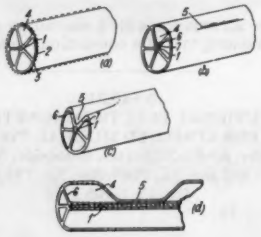
liquid, the gas carrying liquid along thus setting up liquid circulation.

3,588,313

WATER-BLOCKED CARTWHEEL CABLE

Paul Nicholas Delves-Broughton, Caerleon, South Wales, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Feb. 18, 1969, Ser. No. 800,178
Claims priority, application Great Britain, Feb. 22, 1968, 8741/68
Int. Cl. H01b *13/06, 7/12*
U.S. Cl. 174—28 **4 Claims**



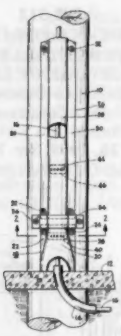
A submersible coaxial cable has a plurality of longitudinal air spaces symmetrically spaced in the dielectric material around the inner conductor with sections collapsed at regular intervals along each airspace to form water blocks in the passageways. Apparatus is provided to extrude the dielectric in the desired form and collapse the walls at selected intervals.

3,588,314

POLE RISER MEMBER WITH VENTILATION SHIELD

Jamshed Behram Havewala, Newark, Del., assignor to Haveg Industries, Inc., Wilmington, Del.

Filed Dec. 22, 1969, Ser. No. 887,050
Int. Cl. H02q *7/20*
U.S. Cl. 174—45 **4 Claims**



A pole riser member encloses a cable on a utility pole and is provided with ventilation openings. A shield is placed directly behind the openings but spaced from the wall containing the openings to provide a passage for air and prevent any objects stuck through the openings from striking a cable.

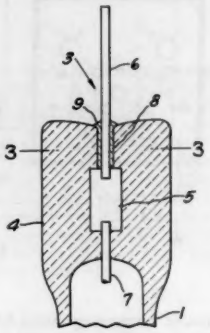
3,588,315

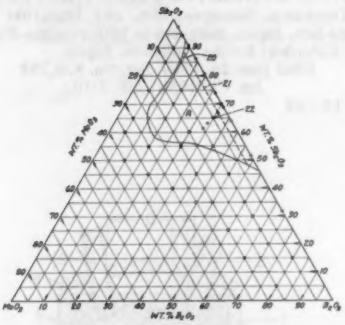
QUARTZ-TO-METAL SEAL

Victor A. Levand, Jr., Lyndhurst; Gene I. Thomasson, Chesterland, and Richard H. Holcomb, South Euclid, Ohio, assignors to General Electric Company

Filed Jan. 15, 1970, Ser. No. 3,012
Int. Cl. H01j *5/00;* **H05k** *5/06*
U.S. Cl. 174—50.64 **5 Claims**

In seals for electrical devices wherein a lead-in conductor comprises a molybdenum foil portion which is embedded and hermetically sealed in a member of fused silica or quartz and also includes an outer lead wire portion which is attached to an end of said foil portion and extends through said quartz member to the exterior thereof with a slight capillary passage between the quartz member and the portion of the outer lead





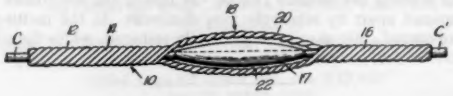
wire enclosed thereby, the said passage if filled with a low melting antimony borate glass which preferably contains a small amount of molybdenum or tungsten trioxide and which forms, at elevated temperatures, a molten seal in said passage which prevents ingress of atmospheric oxygen to the molybdenum foil portion.

3,588,316

APPLIANCE FOR LINEAR BODIES

Thomas F. Peterson, Shaker Heights, Ohio, assignor to Preformed Line Products Co., Cleveland, Ohio

Filed Mar. 17, 1961, Ser. No. 96,522
Int. Cl. H02g *15/08*
U.S. Cl. 174—84R **2 Claims**



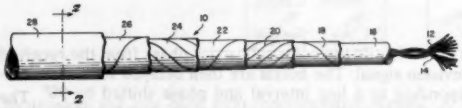
1. The combination comprising a pair of linear bodies, a plurality of elements which have been helically formed prior to application to one of said linear bodies along two spaced portions of their lengths to a mutually conforming internal diameter and pitch length of sufficient magnitude so that the helically formed portions may be applied to at least one of said linear bodies from the side without exceeding the elastic limit and said helically formed spaced portions constituting a full lay, said plurality of elements being divided into a plurality of groups intermediate said helically formed spaced por-

tions with each of said groups being intertwisted intermediate the helically formed spaced portions to form a closed lay having an internal diameter substantially smaller than the internal diameter of said helically formed spaced portions, the helically formed portion adjacent one end of said elements being wrapped around and coaxial with one of said linear bodies and the helically formed portions adjacent the other end of said elements being wrapped around and coaxial with the other of said linear bodies, said intertwisted portion being intermediate said linear bodies.

3,588,317
SHIELDED CABLE

Loren H. Hutchins, Jr., Stoneham, Mass., assignor to Simplex Wire and Cable Company, Cambridge, Mass.

Filed Nov. 8, 1968, Ser. No. 774,466
Int. Cl. H01b *7/32*
U.S. Cl. 174—108 **10 Claims**

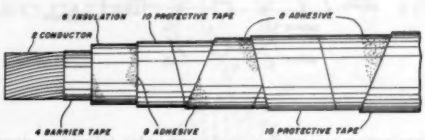


A shielded cable in which one or more insulated conductors are covered by a plurality of layers of spiralled metallic tape. Each tape has a different lay, and one or more tapes are spiralled in each direction. As a result any stray currents induced in the tapes have cancelling fields, and so substantially no current is induced in the inner conductors.

3,588,318
NETWORK CABLE

George E. Ollis, Worcester, Mass., assignor to United States Steel Corporation

Filed Dec. 10, 1969, Ser. No. 883,724
Int. Cl. H01b *7/02*
U.S. Cl. 174—121 **11 Claims**



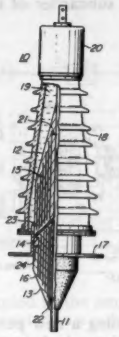
A heat and moisture resistant network cable has a barrier tape over a nickel plated copper conductor. A heat and moisture resistant silicone insulation covers the barrier tape. Three layers of flexible silicone tape are bonded over the insulation with moisture resistant adhesive.

3,588,319
CONDENSER TYPE TERMINAL DEVICES EMPLOYING UNIT INSULATING CYLINDERS

Tokio Isogai; Takashi Tahara, and Toshio Inoue, Hitachi-shi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 4, 1969, Ser. No. 881,960
Claims priority, application Japan, Dec. 11, 1968, 43/90,241
Int. Cl. H01b *17/28*
U.S. Cl. 174—143 **11 Claims**

A condenser-type terminal device comprising a plurality of unit insulating cylinders enclosing a center conductor and being fixed thereto, said unit insulating cylinders being opposed to each other across a clearance intersecting the axis of the center conductor at a predetermined oblique angle, and, further, equipotential electrodes in the unit insulating

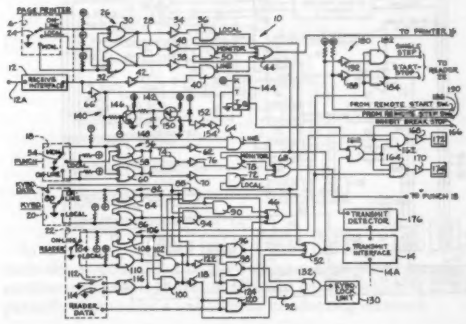


cylinders opposed to each other with a clearance therebetween being arranged in staggered relation.

3,588,320
MODING CONTROL FOR A DATA COMMUNICATION SYSTEM

John Guzak, Jr., Arlington Heights, Ill., assignor to SCM Corporation, New York, N.Y.

Filed Oct. 28, 1968, Ser. No. 771,227
Int. Cl. H04l *15/00*
U.S. Cl. 178—2 **9 Claims**



The application discloses a moding control for a telecommunication system by which data receivers, such as printers and punches, and data transmitters, such as tape readers and keyboard units, are selectively coupled to each other and to incoming and outgoing lines. The transmitters can be placed in online modes or in local modes coupled to local receivers, while three-state local, online, and monitor mode selectors are provided for the receivers. The moding control is exerted by manual selection coupled with logic circuits and is such as to inhibit any transmitter-receiver data interference.

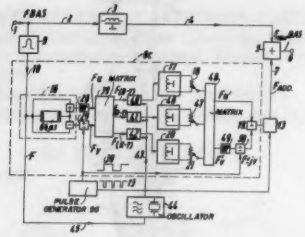
3,588,321
CIRCUIT FOR MODIFYING THE COLOR INFORMATION OF A TELEVISION SIGNAL

Walter Bruch, Hannover, Germany, assignor to Telefunken Patentverwertungsgesellschaft m.b.H., Ulm/Donau, Germany

Filed June 12, 1968, Ser. No. 736,328
Claims priority, application Germany, June 14, 1967, June 12, 1968, P 15 12 613.3;T34599
Int. Cl. H04n *1/46, 5/42*
U.S. Cl. 178—5.2 **3 Claims**

Circuits for modifying the color information contained in a color television signal by producing, from the modulated permanent subcarrier of the originally produced video signal portion, an additional signal whose amplitude and phase is a

predetermined function of the amplitude and phase of such permanent subcarrier, and adding the additional signal to the modulated permanent subcarrier of the originally produced



video signal for providing a new permanent subcarrier containing color information which is modified relative to that contained in the permanent subcarrier of the originally produced video signal.

3,588,322

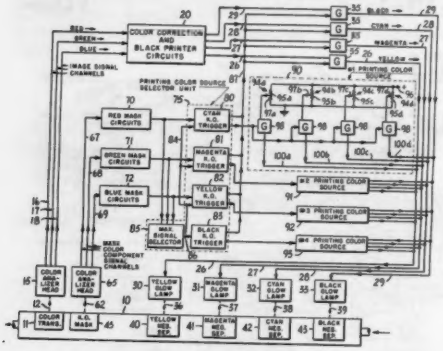
KNOCKOUT MASKING TECHNIQUES

Karl Bartel, New Canaan, and Austin Ross, Monroe, Conn., assignors to Printing Developments, Inc., New York, N.Y.

Filed June 28, 1967, Ser. No. 649,621

Int. Cl. H04n *1/38, 1/46*

U.S. Cl. 178—5.2 **16 Claims**



In electrically producing color separations from image signals of an original, a head scans a knockout mask with colored details to derive three color component signals of which each actuates a corresponding trigger upon reaching a minimum threshold, and a "black" trigger is actuated when all three signals are minimum. Actuation of different triggers serves to replace the image signals by different sets of fixed signals causing ultimate reproduction of scanned mask details in different colors. The mask is a composite of differently color-toned black-and-white film sections.

3,588,323

SYSTEM FOR SYNCHRONIZING THE PHASE OF COLOR SYNCHRONIZATION SIGNALS IN THE RECEIVER TO THE PHASE OF THE COLOR SUBCARRIER IN THE RECEIVED SIGNAL IN A PAL RECEIVER

Gerhard Krause, Darmstadt, Germany, assignor to Fernseh GmbH, Darmstadt, Germany

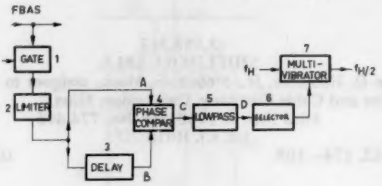
Filed Oct. 10, 1968, Ser. No. 766,406

Claims priority, application Germany, Oct. 12, 1967, P 15 37 123.0

Int. Cl. H04n *5/42*

U.S. Cl. 178—5.4 **7 Claims**

A received color television signal has a single color subcarrier and a color synchronization signal (burst) whose phase alternates between plus and minus 45° for sequential lines. Switching signals for synchronizing the phase of said color subcarrier in the receiver to the phase of said color synchronization signal are supplied by frequency dividing circuit which receives a single line synchronization signal for each line and furnishes signals of half-line frequency. Phase selector signals for selecting the phase of the frequency dividing circuit are generated by first separating the bursts and



serve to identify the color subcarrier phase from the received television signal. The bursts are then delayed for a time corresponding to a line interval and phase shifted by 90°. The phase shifted bursts are compared to the bursts without delay in a phase comparator the output signals of which have a polarity corresponding to the product of the polarities of the input signals. After filtering, signals of one polarity are selected to constitute the signals determining the phase of the frequency dividing circuit.

3,588,324

COLOR IMAGE PROJECTORS

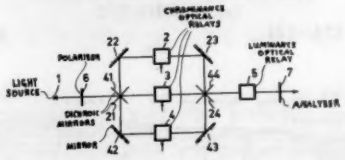
Jerard Marie, L'Hay-les-Roses, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 20, 1967, Ser. No. 632,273

Claims priority, application France, Apr. 22, 1966, 58739

Int. Cl. H04n *9/14*

U.S. Cl. 178—5.4 **14 Claims**



A projection system for displaying color television signals in which polarized light is first directed to two or more optical relays for rotation as a function of low definition color signals. The chrominance relays may be either in series or parallel with respect to the light. The resultant light beam is then rotated as a function of a high definition luminance signal, and applied to a projection system by way of an analyzer arranged to pass light that has been rotated 90°.

3,588,325

COLORED LIGHT TRANSMISSION COMPENSATING ENCODING FILTER

Henry Ball, and Theodor M. Wagner, Burbank, Calif., assignors to RCA Corporation

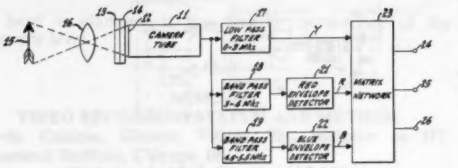
Filed Nov. 12, 1968, Ser. No. 774,609

Int. Cl. H04n *9/06*

U.S. Cl. 178—5.4 **13 Claims**

A color television camera tube has two different color signal filter grating components through which light from a subject is projected onto the photosensitive electrode of the tube. One grating component has cyan light transmissive (red light blocking) strips, which undesirably absorb some green light, alternating with strips which absorb green light to the same extent as the cyan strips. The other grating component has yellow light transmissive (blue light blocking) strips,

which undesirably absorb some green light, alternating with strips which absorb green light to the same extent as the yellow strips. The strips of the two filter grating components are so arranged relative to one another that, when the corresponding areas of the photosensitive electrode of the camera tube are scanned by an electron beam, red and blue subject-light-representative signals are generated as amplitude modulations of carrier waves respectively having two different relatively high fundamental frequencies. The modulated carrier waves are separated by band-pass filters and the respective carrier outputs are envelope or otherwise detected



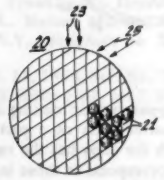
to develop red and blue light-representative signals. A luminance signal, derived from the camera tube through a low pass filter, is matrixed with the red and blue light-representative signals to produce luminance and color difference signals. Each of the green light absorbing strips adjacent the cyan and yellow light transmissive strips is substantially transparent except for an auxiliary band having the property of absorbing green light; the material, density and width of the auxiliary band being such that each auxiliary band absorbs substantially the same amount of green light as that undesirably absorbed by each of the cyan and yellow light passing strips.

3,588,326

LENS ARRAY IMAGING SYSTEM FOR A COLOR ENCODING CAMERA

Hugh F. Frohbach, Sunnyvale, Calif., assignor to RCA Corporation of America

Filed Feb. 12, 1969, Ser. No. 798,678
Int. Cl. H04n *9/06*
U.S. Cl. 178—5.4ST **5 Claims**



In a color encoding camera utilizing a color encoding strip filter arrangement in the optical path to separate light from an object into its component colors, an imaging arrangement including a lens array is utilized to image the encoding filter strips onto a photosensitive medium without the use of a relay lens.

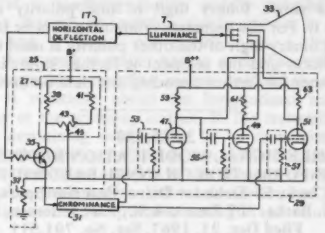
3,588,327

DC BLANKING AND IMAGE REPRODUCER BIAS ADJUSTING CIRCUITRY

Karol Siwko, and Joseph Edward Thomas, Batavia, N.Y., assignors to Sylvania Electric Products Inc.

Filed Apr. 4, 1969, Ser. No. 813,572
Int. Cl. H04n *9/18*
U.S. Cl. 178—5.4R **11 Claims**

The bias potential applied to an image reproducer from an amplifier means having a bias potential developing means is varied by adjustment of an alterable impedance in a circuit



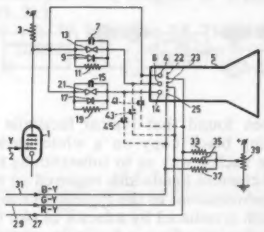
network means DC coupled to the amplifier means and to a pulse amplifier means coupled to a pulse signal source.

3,588,328

APPARATUS FOR MAINTAINING COLOR BALANCE DESPITE VARIATIONS OF THE SUPPLY VOLTAGE

Leonardus Adrianus Johannes Verhoeven, and Hendrikus Dollekamp, Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 22, 1969, Ser. No. 859,988
Claims priority, application Netherlands, Sept. 21, 1968, 681,3540
Int. Cl. H04n *9/48*
U.S. Cl. 178—5.4R **2 Claims**



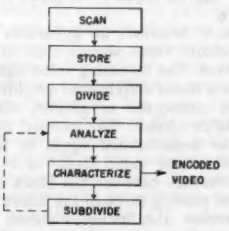
In a three-gun color display tube at least one of the cathodes is connected to the luminance amplifier through a nonlinear negative feedback resistive circuit, which is at least partially shunted by a unilaterally conducting element.

3,588,329

SELECTIVE BINARY ENCODING OF VIDEO INFORMATION SIGNALS

John Monk, Harrow, England, assignor to Xerox Corporation, Rochester, N.Y.

Filed Aug. 10, 1966, Ser. No. 571,599
Claims priority, application Great Britain, June 15, 1966, 26,805/66
Int. Cl. H04n *7/12*
U.S. Cl. 178—6 **8 Claims**



A selective encoding technique wherein each line of binary data is divided and subdivided in response to the detec-

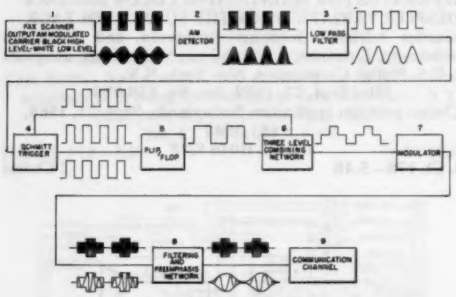
tion of black or printed information according to the information content on a document, for example. The segments of binary digits in the waveform are inspected in sequence and for each segment that contains all background or white information, a single binary digit of one polarity is used to represent it. For the segments containing data or black information, a binary digit of the other polarity is used to describe this condition and the segment is further subdivided in the same manner for further encoding and data detection.

3,588,330

FACSIMILE SIGNAL MODIFICATION REDUCING THE INFORMATION CHANNEL BANDWIDTH

John H. Clark, 55 Elchester Drive, East Northport, N.Y., and Rene C. Bache, 307 Emerson St., Port Jefferson, N.Y.

Filed Dec. 21, 1967, Ser. No. 701,511
Int. Cl. H04h *1/20*
U.S. Cl. 178—6 **4 Claims**



It has been found that typical facsimile signals derived from scanning black copy on a white background can be processed in such a way as to substantially reduce the communication channel bandwidth required to transmit a given amount of information. In the typical system to be described the bandwidth is reduced by a factor of two to one. Pulses of modulated subcarrier from a facsimile scanner are processed to form a three level signal having one-half the repetition rate or frequency of the original signals and hence one-half the frequency bandwidth. These reduced bandwidth signals are transmitted over the communication channel. At the receiving end the reduced bandwidth signals are processed to restore their original form and are then applied to a facsimile recorder. This invention permits either twice the information to be sent over a given channel of restricted bandwidth or to send the same amount of information over a channel having one-half the bandwidth.

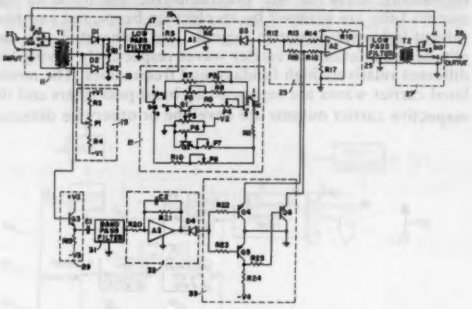
3,588,331

FACSIMILE VIDEO REMODULATION NETWORK

Charles H. Vermillion, Greenbelt, Md., assignor to the United States of America as represented by The Administrator of the National Aeronautics and Space Administration

Filed May 29, 1968, Ser. No. 733,039
Int. Cl. H04n *5/14*; **H04b** *7/14*
U.S. Cl. 178—6 **9 Claims**

This disclosure describes an apparatus for restoring and improving facsimile video signals that have been degraded prior to reception. The incoming video signal is demodulated and applied to a linear differential amplifier circuit and to a control circuit connected in parallel with the linear differential amplifier circuit. The control circuit controls the restoring of the demodulated signal by linearly controlling the black level of the video signal or by nonlinearly controlling the difference between the black and white levels of the video signal passing through the linear differential amplifier. The invention also includes means for detecting the frequency of video carrier signal and using the detected signal to control a switching network. The switching network switches its output at the frequency of and coherently with the incoming signal. The output of the switching circuit modulates the restored video signal in a modulator. Hence,



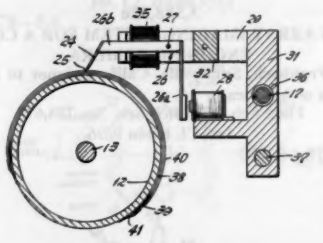
the output from modulator is a restored video signal having a carrier frequency that is the same as the carrier frequency of the unrestored (incoming) video signal.

3,588,332

FACSIMILE APPARATUS WITH VIBRATING PRESSURE STYLUS AND METHOD THEREOF

Angelo Vaccaro, Port Washington, and Harold F. E. Dixon, Douglaston, N.Y., assignors to Columbia Controls Research Corporation, Glen Cove, N.Y.

Filed Sept. 17, 1968, Ser. No. 760,324
Int. Cl. H04n *1/24*
U.S. Cl. 178—6.6 **4 Claims**



A method and apparatus for making a facsimile copy of an original subject matter such as a picture, drawing, photograph, etc. in which the copy has the varying shades or tones of blackness that correspond to those in the original by utilizing a pressure-responsive copy sheet and a stylus with the stylus having both a variable pressure against the transfer sheet and also being vibrated to vary the width of the line on the sheet.

3,588,333

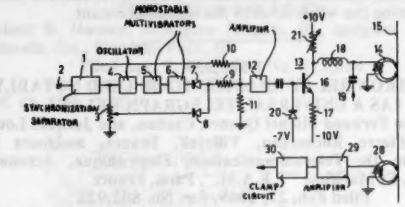
DEVICE FOR MAGNETICALLY RECORDING AND READING A TELEVISION SIGNAL

Edmond De Niet, and Pieter Damstra, Emmasingel, Eindhoven, Netherlands

Filed Mar. 21, 1967, Ser. No. 624,943
Claims priority, application Netherlands, Mar. 26, 1966, 6,604,018
Int. Cl. H04m *5/78*
U.S. Cl. 178—6.6 **9 Claims**

In a video recording system for television signals, the signals are provided with a reference level (e.g. midway between the maximum and minimum levels) during the back porch of the synchronizing period. The current through the

magnetic recording head is set to be zero at the reference level. In the reproducing system, the output of the reproducing head is clamped at the time of occurrence of the reference level.

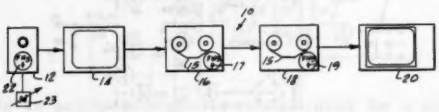


3,588,334

VIDEO RECORDING SYSTEM AND METHOD

Marvin Camras, Glencoe Village, Ill., assignor to IIT Research Institute, Chicago, Ill.

Filed Apr. 3, 1967, Ser. No. 627,756
Int. Cl. H04n *1/78*
U.S. Cl. 178—6.6 **5 Claims**



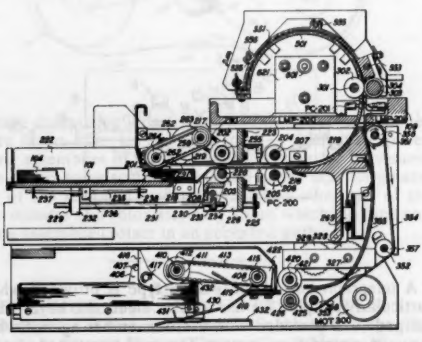
A magnetic transducer system and method for varying the speed of action of a recorded video signal including a video camera with a selectable scan rate, a magnetic recorder for recording the video signals from the camera at a given speed, a variable speed drive for the recorder for playback of the recorded video signals at a second speed such that the playback scan rates are the standard rates for display by a commercial television receiver, or integral multiples or submultiples of such standard rates. A rotatable head recorder or playback device with stationary scanning during the other of playback or recording may be employed.

3,588,335

FACSIMILE TRANSCEIVER APPARATUS

Halbert M. Harris; Franklin L. Headd; Ralph R. Tilly, Webster; Charles L. Huber, Marion, and Robert H. Rugaber, Pittsford, N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Filed Sept. 11, 1968, Ser. No. 758,932
Int. Cl. H04n *1/02, 1/12, 1/24*
U.S. Cl. 178—6.6 **25 Claims**



A facsimile transceiver apparatus for use in a facsimile system to convert information on record media into electrical signals for transmission to a remote location in a transmit mode and to convert electrical signals received from a remote location into representative information on record media in a receive mode. Information is scanned and recorded at a scanning station axially located along a passageway having an arcuate configuration in a lateral direction and a linear configuration in a longitudinal direction. A support member having optical scanning means and electrographic recording means operatively associated therewith is rotatable about the longitudinal axis of the passageway at the scanning station. In the transmit mode, a document containing information to be transmitted is advanced into the passageway by an automatic document transport system and upon rotation of the support member, electrical signals representative of the information are generated for transmission as the optical scanning means traverses the document.

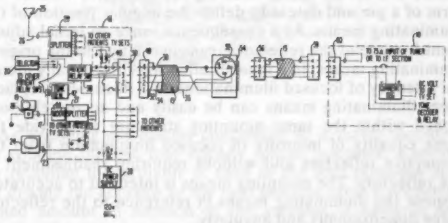
In the receive mode, a copy sheet onto which information is to be recorded is advanced into the passageway by an automatic copy sheet transport system and upon rotation of the support member, electrostatic charge patterns are produced on the copy sheet in response to received electrical signals as the electrographic recording means traverses the copy sheet. The charge patterns of information on the copy sheet are rendered visible by means of an electrostatic powder developing apparatus which uniformly deposits a quantity of powder marking particles onto the surface of the electrostatically charged copy sheet. The developed image is then fused to the surface of the record media to provide a permanent facsimile copy of the received information.

3,588,336

HOSPITAL COMMUNICATION SYSTEM

Harry Scher, Brooklyn, N.Y., assignor to Wells Television, Inc., New York, N.Y.

Filed Aug. 30, 1968, Ser. No. 756,650
Int. Cl. H01b *7/00, 11/00;* **H04n** *7/18*
U.S. Cl. 178—6.8 **4 Claims**

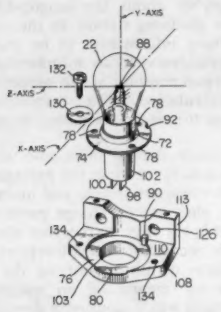


An improved hospital communication system including a composite cable for carrying television signals between television equipment located at a nurse's station and in a patient's room. The composite cable also carries low voltage direct current for operating the television equipment in the patient's room. The composite cable includes a coaxial cable for carrying the television signals and insulated conductors extending along the coaxial cable for carrying the DC operating power. A covering is wrapped around the coaxial cable and conductors to form the composite cable. In one embodiment of the system, a television receiver in the patient's room is selectively connected to a television camera at the nurse's station so that the nurse's image is displayed on the patient's receiver. In another embodiment, a surveillance T.V. camera is added to the system in the patient's room for transmitting an image of the patient to a surveillance monitoring receiver located at the nurse's station. The same composite cable transmits television signals between the surveillance camera and surveillance receiver simultaneously with the transmission of television signals from the nurse's camera to the patient's television receiver. The same cable also supplies low voltage DC for operating the surveillance camera. In both embodiments, the hospital's master T.V. antenna is normally coupled through the composite cable to the patient's television receiver so that the patient normally enjoys broadcast television programs picked up by the antenna.

3,588,337
MOUNTING MEANS FOR LIGHT SOURCE IN FACSIMILE EQUIPMENT

Ernest John Okleshen, Fort Wayne, Ind., assignor to The Magnovox Company, Fort Wayne, Ind.

Filed Feb. 24, 1969, Ser. No. 801,609
Int. Cl. H04n *1/02*; **F21v** *19/04*; **H01r** *13/64*
U.S. Cl. 178—7.1 **5 Claims**

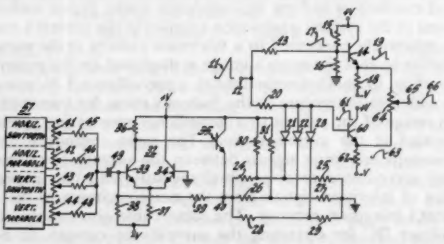


This invention pertains to an improved mounting means for an illuminating source in facsimile equipment in which the illuminating source is accurately positioned in relation to two adjustable reflector means so that each reflector means will focus substantially identical intensity of illumination on a document, to provide substantially identical energization of an optical transducer which translates the intensity of the light received to an electrical output. The improved mounting means consists of a recess which receives a flange forming an integral part of the illuminating means with an accurate and close fitment so that the original illuminating means and any replacement illuminating means are accurately positioned three dimensionally from the respective reflector means and an additional locating means is provided in the form of a pin and detent to define the angular position of the illuminating means. As a consequence, once an initial adjustment is made of the reflector means in relation to the original illuminating means, in a manner effecting substantially identical intensity of focused illuminations on a document, replacement illuminating means can be easily and accurately positioned within the same mounting structure to provide the same equality of intensity of focused illumination from the respective reflectors and without requiring readjustment of the reflectors. The mounting means is intended to accurately dispose the illuminating means in reference to the reflectors three dimensionally and angularly.

3,588,338
GAMMA CORRECTION AND SHADING MODULATION CIRCUITRY FOR A TELEVISION CAMERA

Robert A. Dischert, Burlington, and Laurence Joseph Thorpe, Marlton, N.J., assignors to RCA Corporation

Filed Mar. 21, 1969, Ser. No. 809,230
Int. Cl. H04n *5/20*, *5/21*
U.S. Cl. 178—7.1 **18 Claims**

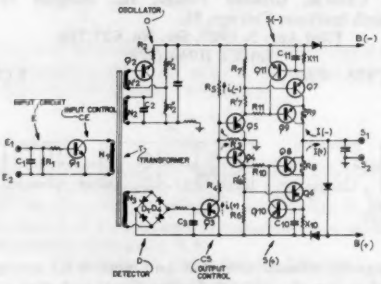


In a television camera apparatus is provided for adding gamma correction and shading modulation correction and varying the pedestal height of video signals. One circuit combines the functions of gamma correction and shading modulation correction. Another circuit combines the functions of gamma correction and pedestal or black level control while maintaining the white level of the signals constant.

3,588,339
ELECTRON RELAY ADAPTED TO BE USED NOTABLY AS A UNIVERSAL TELEGRAPH RELAY

Christian Fernand Michel Quenet, Cachan, and Jacques Louis Jean-Pierre Rochereau, Villejuif, France, assignors to Societe De Telecommunications Electronique, Aeronautique, Et Maritime "T.E.A.M.", Paris, France

Filed Feb. 27, 1969, Ser. No. 802,932
Claims priority, application France, Feb. 29, 1968, 141882
Int. Cl. H04l *25/52*
U.S. Cl. 178—70R **7 Claims**

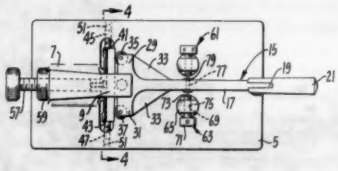


The input and output circuits of an electronic universal telegraph relay are coupled by an information transfer circuit including an oscillator and a rectifier operatively coupled to a transformer having a separate winding, the circuit of which is closed by an input control element for blocking said oscillator when the signal applied to said input circuit is of a predetermined polarity. The voltage generated by said rectifier selectively controls the conduction state of an output control element, which in turn controls the switching of said output circuit.

3,588,340
PADDLE KEY

Merritt A. Clover, 2234 Fernwood Court, Hayward, Calif.

Filed June 11, 1969, Ser. No. 832,045
Int. Cl. H01h *21/86*
U.S. Cl. 178—108 **5 Claims**



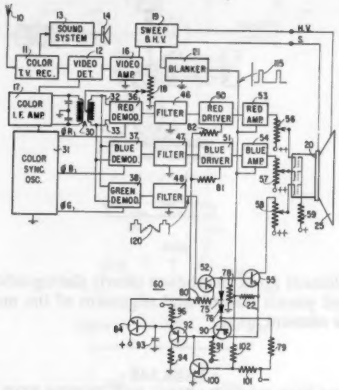
A telegraph key of the paddle type is provided which is particularly adapted for use with an electronic keyer wherein the paddle is provided with a crossmember against which a spring mounted plate presses. The spring mounted plate centers the keying paddle and adjustments are provided for tension and individually for the arc through which the paddle moves for making dots and dashes.

3,588,341

AUTOMATIC BRIGHTNESS CONTROL CIRCUIT FOR ESTABLISHING THE BLACK LEVEL OF SIGNALS IN A TELEVISION RECEIVER

Robert B. Hansen, Arlington Heights, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Apr. 1, 1969, Ser. No. 812,014
Int. Cl. H04m 5/16
U.S. Cl. 178—7.5DC 9 Claims



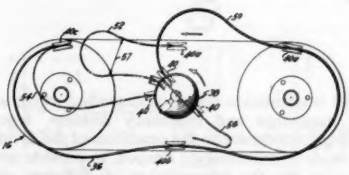
In an automatic brightness control circuit for a color television receiver using direct demodulation of the color and brightness signals, the signals present on the base and emitter of the green NPN output transistor amplifier are compared by connecting them across the base-emitter path of a PNP transistor; and whenever the NPN transistor is cut off, indicative of a black level signal, the PNP comparison transistor is rendered conductive. The collector of the comparison transistor is connected through an integrating circuit, the output of which is used to vary the DC operating levels of the three driver amplifiers in a closed loop control system.

3,588,342

FACSIMILE COMMUTATOR SCANNING STRIP

Frans Brouwer, Glencoe, and Frank L. Sobchak, Chicago, Ill., assignors to Stewart-Warner Corporation, Chicago, Ill.

Filed Dec. 30, 1968, Ser. No. 787,860
Int. Cl. H04n 1/14
U.S. Cl. 178—7.6 6 Claims



A tape comprising strips of beryllium copper sandwiched between layers of mylar and connected in tandem to spaced scanning assemblies of a facsimile transceiver for movement past an object to be scanned. One end of the tape terminates at one of the scanning assemblies and the other end of the tape terminates at a rotor assembly about which the tape and scanning assemblies rotate in an eccentric path.

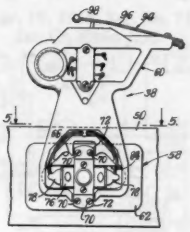
3,588,343

FACSIMILE OPTICAL SCANNER ASSEMBLY

Frans Brouwer, Glencoe, and Frank L. Sobchak, Chicago, Ill., assignors to Stewart-Warner Corporation, Chicago, Ill.

Filed Jan. 9, 1969, Ser. No. 790,071
Int. Cl. H04n 1/24
U.S. Cl. 178—7.6 1 Claim

A timing belt assembly comprised of an endless flexible belt of elastomeric material adapted to be trained about drive and idler pulley assemblies for supporting optical scanner



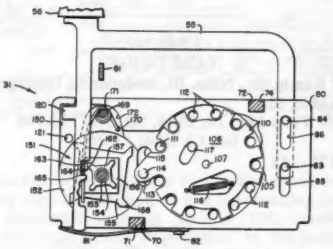
units and moving the same in a continuous closed path upon rotation of the drive pulley assembly.

3,588,344

ENCODING MECHANISM

Francis P. Kahanic, Chicago, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Mar. 26, 1968, Ser. No. 716,150
Int. Cl. H04l 15/16
U.S. Cl. 178—17 7 Claims



An encoding mechanism comprising an actuator mounted for rotation through four equally spaced positions, a spring for retaining the actuator in each of the four positions and for driving the actuator to the next position upon a predetermined amount of rotation of the actuator, a keylever for rotating the actuator the predetermined amount, a rotatably mounted shutter and a plurality of fingers extending from the actuator and positioned to engage the shutter, to rotate the shutter through a predetermined arc and to release the shutter as the actuator moves to the next position under the action of the spring.

3,588,345

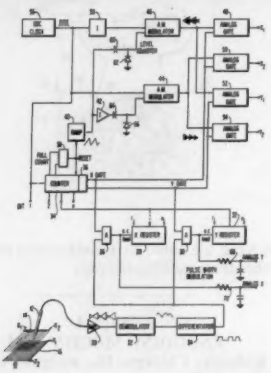
POSITION TRANSDUCER USING A SWEEPING FIELD NULL

Herbert Dym, Mahopac, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 11, 1968, Ser. No. 720,723
Int. Cl. G08c 21/00
U.S. Cl. 178—18 9 Claims

The position of a capacitive probe on a writing tablet is converted into digital and analogue signals by detecting the time at which a voltage null passes the capacitive probe. A voltage null is swept along one dimension of the writing tablet by applying a pair of equal frequency out-of-phase signals, which are amplitude modulated to provide equal rates of increase and decrease, respectively, to the opposite ends of a resistor placed along the dimension to be measured. The null moves linearly across the tablet along the dimension to be measured. The output from the capacitive probe is a waveform having an envelope which reduces to a null at one point during each sweeping period. The time difference between the start of the sweep and the occurrence of the null

is a measure of the position of the capacitive probe along the dimension to be measured. Two dimensional measurements can be accomplished by sweeping the null along the surface in a pair of orthogonal directions, using either a time mul-



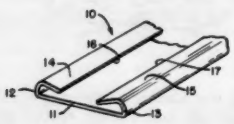
tiplexing technique, wherein the null is swept along a single dimension at a time, or a frequency multiplexing technique, wherein the carrier frequencies used to sweep the null along the orthogonal dimensions are different frequencies.

3,588,346

TAPE GUIDE

Robert J. Ramig, Jr., Niles, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Apr. 24, 1968, Ser. No. 723,705
Int. Cl. H04l *13/06*
U.S. Cl. 178—42 **5 Claims**



A guide for paper tapes comprising a flat bottom wall, curved sidewalls that extend upwardly from the edges of the bottom wall and top walls that extend downwardly and inwardly from the upper edges of the sidewalls toward the center of the bottom wall to provide tape locating edges in the center of the guide and enlarged clearance passages at the edges of the guide to accommodate tapes having wrinkled edges.

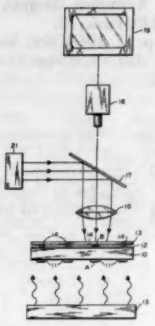
3,588,347

METHOD AND APPARATUS FOR ALIGNING A MASK AND A SUBSTRATE USING INFRARED RADIATION

Liber J. Montone, and Donald C. Walls, Reading, Pa., assignors to Western Electric Company, Incorporated, New York, N.Y.

Filed Mar. 13, 1969, Ser. No. 806,919
Int. Cl. H04n *7/18*
U.S. Cl. 178—6.8 **12 Claims**

Mask areas are aligned on an untreated surface of a semiconductive wafer with elements formed on the opposite side of the wafer by impinging infrared radiation onto both the top and bottom surfaces of the superimposed mask and wafer and viewing the superimposed reflected images and shadow images of the elements and mask areas on a television screen. Infrared radiation passing through the bottom surfaces project shadow images of the elements and the mask areas on the television screen. Infrared radiation impinged from below penetrates the wafer to isolate the element areas on the screen and visible light impinged from above isolates the mask areas and together the isolated areas emphasize the lines of demarcation between the shadows of the mask areas



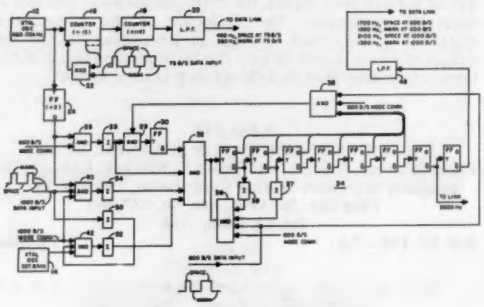
and the element areas to produce clearly distinguishable light images and permit shifting and alignment of the mask areas within the element areas.

3,588,348

SYSTEM FOR GENERATING FSK TONES FOR DATA TRANSMISSION

John C. Bowling, Rochester, N.Y., assignor to General Dynamics Corporation

Filed July 25, 1968, Ser. No. 747,643
Int. Cl. H04h *27/00*
U.S. Cl. 178—66 **8 Claims**



A FSK transmission system is described which utilizes two crystal oscillators and frequency dividers, together with digital logic responsive to the condition of the divider, as well as the mode of transmission desired, to provide several tonal frequencies for the transmission of different channels of digital information. The system has a performance compatible with the recommendations promulgated by the CCITT for the transmission of digital information by FSK tones.

3,588,349

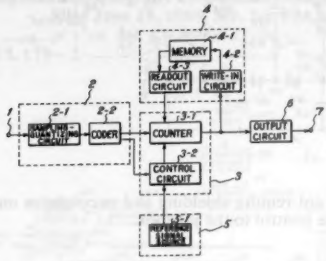
DEMODULATION APPARATUS OF A PHASE-MODULATED TELEGRAPHIC WAVE OR WAVES

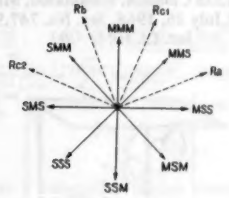
Kazuo Kawai, Tokyo-to; Sotokichi Shintani, Iruma-gun, and Hidetaka Yanagidaira, Ohmiya-shi, Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo-to, Japan

Filed Dec. 9, 1968, Ser. No. 782,316
Claims priority, application Japan, Dec. 18, 1967, 42/78376
Int. Cl. H04l *2.7/00*
U.S. Cl. 178—66 **5 Claims**

An apparatus for demodulating at least one phase-modulated telegraphic wave by comparing the phase position of

the telegraphic wave with the phase position of at least one reference phase wave, where the phase-modulated telegraphic wave is sampled and coded to digital signals of quantized code configuration so that demodulation of the phase-





modulated telegraphic wave is performed by repeatedly accumulating, for the duration of each signal element of the phase-modulated wave, comparison results between the coded digital signals and the reference phase wave.

3,588,350

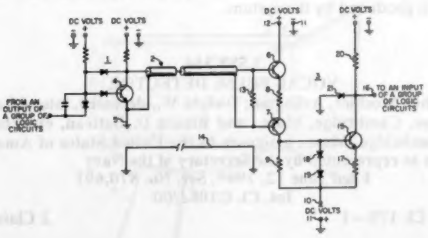
WIDE-BAND DC COUPLED CABLE TRANSMISSION CIRCUIT INDEPENDENT OF GROUND CIRCUIT VOLTAGE VARIATIONS

Carlos S. Higashide, Chicago, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed June 19, 1969, Ser. No. 834,810

Int. Cl. H04l *15/00*

U.S. Cl. 178—68 **6 Claims**



Input circuits of receivers connected to cables in fast-operating logic systems are isolated from noise and voltage differences in return circuits common to groups of logic circuits interconnected by the cables. The receiving end of each line of a cable is connected to the bases of a pair of complementary transistors of a receiver, and an output circuit is connected between their collectors. Either direct-current pulses or high-frequency pulses can be received even if a common return circuit is not connected between the groups of logic circuits.

3,588,351

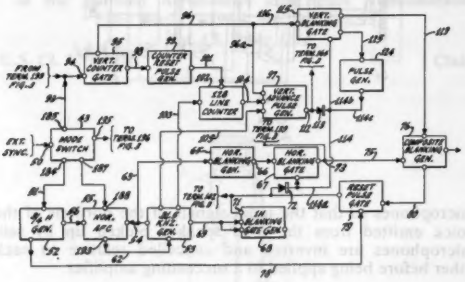
TELEVISION BLANKING AND SYNCHRONIZING SIGNAL GENERATOR

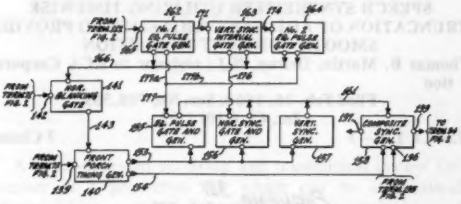
Leonard J. Baun, Cinnaminson, N.J., assignor to RCA Corporation

Filed Mar. 19, 1968, Ser. No. 714,256

Int. Cl. H04n *1/36*

U.S. Cl. 178—69.5 **15 Claims**





The generator operates either in a locked mode responsive to incoming sync information or in a free-running mode. The blanking apparatus includes a 31.5 kHz. multivibrator providing the basic timing information. In the locked mode its frequency and phase are controlled by an automatic frequency control (AFC) circuit by which it is compared with the incoming sync signal. The blanking generator supplies timing information to the sync generator by which the horizontal and vertical sync signals are produced. In the free-running mode of the apparatus the basic timing unit is controlled by a preset voltage and the necessary timing of the vertical blanking intervals relative to the horizontal blanking intervals is controlled by sync signals derived from the sync signal generator and fed back via a closed loop circuit to the blanking generator. In the locked mode the timing relationship between the vertical and horizontal blanking intervals is controlled by the incoming sync signal and a counting system deriving timing information from the basic timing unit. In the latter case, the loop circuit from the sync generator to the blanking generator is opened and the horizontal and vertical timing relationship is controlled by the sync received from the external source. A mode switch, which is responsive to a sync signal detector, controls the apparatus in either of its two modes depending upon the presence or absence of sync signals received from an external source.

3,588,352

HOWLING ELIMINATION SYSTEM FOR USE IN SIMULTANEOUS TWO-WAY COMMUNICATING DEVICE AND A HOWLINGLESS SIMULTANEOUS TWO-WAY COMMUNICATING DEVICE

Ichiro Yamawaki, Shinohara-cho 678, Kohoku-ku, Yokohama-shi, Japan

Filed Mar. 21, 1967, Ser. No. 624,840

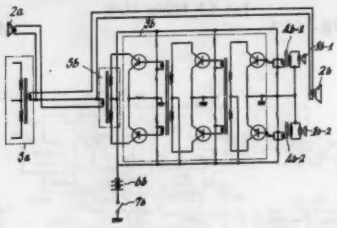
Claims priority, application Japan, Mar. 28, 1966, Mar. 28, 1966, Apr. 8, 1966, 41/19478;41/19479;41/22143

Int. Cl. H04m *1/20, 9/08*

U.S. Cl. 179—1 **2 Claims**

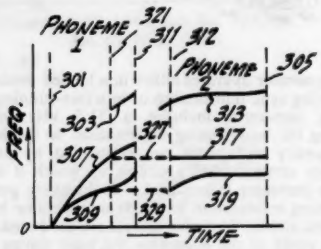
Howling in simultaneous communicating system can be eliminated by the provision, in each of the pair of trans-

mitting-receiving instruments, of two microphones disposed in geometrically and electrically symmetrical relation relative to a loud speaker, and two input transformers connected, for differential action, to said microphones so as to follow said



microphones so that the input signals of the portions of the voice emitted from the loud speaker picked up by said microphones are inverted and cancelled relative to each other before being applied to a succeeding amplifier.

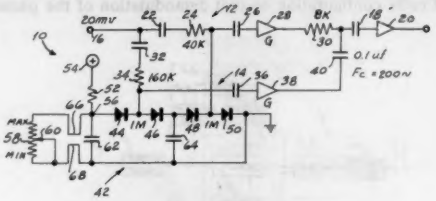
3,588,353
SPEECH SYNTHESIZER UTILIZING TIMEWISE TRUNCATION OF ADJACENT PHONEMES TO PROVIDE SMOOTH FORMANT TRANSITION
Thomas B. Martin, Delran, N.J., assignor to RCA Corporation
Filed Feb. 26, 1968, Ser. No. 708,389
Int. Cl. G10l *1/02*
U.S. Cl. 179—1 **7 Claims**



A method of and apparatus for synthesizing speech from phonemes are described. The smooth transition of one phoneme into the next is accomplished by a timewise truncation of the end of the leading phoneme and of the beginning of the following phoneme so that the formants are continuous over the junction. The apparatus described stores phonemes in either a digital or an analog manner to permit their retrieval, starting and stopping the retrieval so that the desired truncation is achieved. The invention herein described was made in the course of or under a contract or subcontract thereunder with the Department of the Air Force.

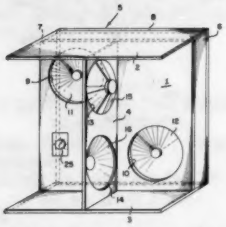
3,588,354
REMOTE LOUDNESS CONTROL
Gilbert J. Vollink, Grand Rapids, Mich., assignor to Rowe International, Inc., Whippany, N.J.
Filed Dec. 20, 1967, Ser. No. 692,022
Int. Cl. H03g *1/02, 9/00*
U.S. Cl. 179—1 **16 Claims**

A remote loudness control for a jukebox or the like in which the audio signal passes through two parallel channels, one of which is resistive and the other of which presents a high impedance to low frequencies and a relatively lower impedance to high frequencies. As the loudness control is operated to reduce loudness from a maximum, means including a direct current rheostat differentially varies the gains of the respective channels to cause the higher frequencies to be more greatly attenuated than are the lower frequencies. The



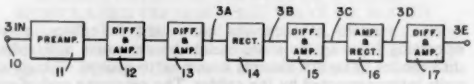
control does not require shielding and necessitates only two wires from the control to the jukebox.

3,588,355
STEREOPHONIC LOUDSPEAKER SYSTEM
James P. Holm, 1335 Calhoun, Kalamazoo, Mich.
Filed July 26, 1968, Ser. No. 747,946
Int. Cl. H04r *5/02*
U.S. Cl. 179—1 **9 Claims**



A stereophonic loudspeaker system is provided comprising two pairs of loudspeakers. Each pair is oriented with their axes at right angles to each other and substantially equidistant from the point of intersection of the axes. The speakers are so arranged that one speaker of each pair faces the listener and the other speaker has its axis substantially perpendicular to the listener. Means are provided for matrixing the signals produced by a right and left amplifier system to provide a sum signal and a difference signal. Sum signals are applied in phase to the speakers whose axes are directed toward the listener, and difference signals are applied to the speakers whose axes are positioned at right angles with respect to the direction of the listener, the difference signals to the two perpendicular speakers being applied 180° out of phase with each other. As a result, a stereophonic sound effect is produced by the system.

3,588,356
VOCAL PULSE DETECTOR
Stephen Moshier, Arlington; Dwight W., deceased, late of Batteau, Cambridge, Mass., and Blanca D. Batteau, executor, Cambridge, Mass., assignors to the United States of America as represented by the Secretary of the Navy
Filed June 12, 1969, Ser. No. 870,691
Int. Cl. G10l *1/00*
U.S. Cl. 179—1 **2 Claims**

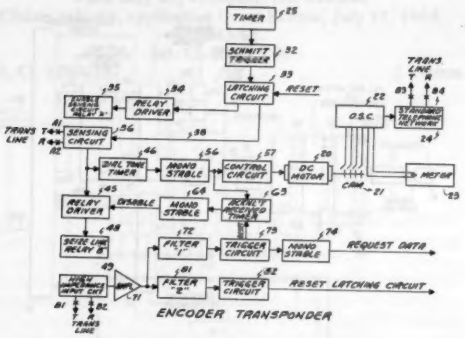


A speech recognition system for identifying the time at which a vocal pulse occurs comprising electronic circuitry including differentiating circuits and rectifiers for producing a single output pulse at and only at the time of the input vocal pulse corresponding to a particular phonetic sound.

3,588,357
AUTOMATIC REMOTE METER READING OVER TELEPHONE LINE

Daniele Sellari, Jr., Corinth, Miss., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed June 19, 1969, Ser. No. 834,842
Int. Cl. H04m 11/00
U.S. Cl. 179—2 8 Claims

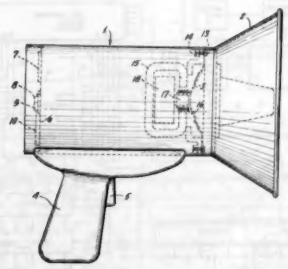


Equipment at a subscriber station times out every four weeks, depending upon design specifications. When it does, the telephone number of a public utility data processor is read out if the telephone line to the local station is then idle. When the data processor replies, a meter reads out its existing setting. If the line is or becomes busy before all information is fed into the data processor, the station equipment goes into a waiting condition until the line again becomes idle. Calls are then placed repeatedly during idle conditions until a complete block of information is sent out and an acknowledgement signal is received from the data processor.

3,588,358
METHOD AND APPARATUS FOR TESTING HEARING

H. Wayne Rudmose, and Nelson N. Estes, Austin, Tex., assignors to Tracor, Inc., Austin, Tex.

Continuation-in-part of application Ser. No. 470,358, July 8, 1965, now abandoned. This application Aug. 29, 1968, Ser. No. 756,256
Int. Cl. H04r 27/04; A61b 5/12
U.S. Cl. 179—1N 83 Claims



This invention pertains to a method of testing hearing employing a warbled sound which may be set at each of a plurality of constant amplitude levels. Apparatus especially adapted for use in such a method is portable with a self-contained battery and having electronic components for generating and modulating an electrical signal which is impressed on a transducer means. The resultant signal may be either frequency modulated about a center frequency within the audible range of the tested subject or may be a constant frequency signal within such an audible range, amplitude modulated in such a manner to simulate the warbling of a frequency modulated signal.

3,588,359
PROTECTIVE SUIT HAVING AN AUDIO TRANSCEIVER

Herbert E. Cribb, Satellite Beach, Fla., assignor to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration

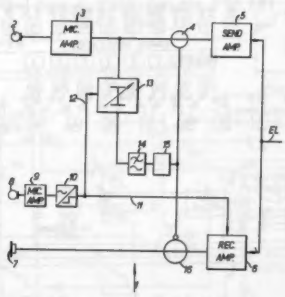
Filed Dec. 11, 1968, Ser. No. 782,955
Int. Cl. H04r 1/44
U.S. Cl. 179—1R 1 Claim

A voice-operated receiving and transmitting system for a wearer of a protective suit which can be automatically changed from a receiving condition to a transmitting condition responsive to the wearer's voice. The system is provided with a control for regulating the audio level at which the switching operation takes place.

3,588,360
TELECOMMUNICATION SYSTEMS

Keith Anthony Thomas Knox, London, England, assignor to Her Majesty's Postmaster General, London, England

Filed Feb. 3, 1969, Ser. No. 796,026
Int. Cl. H04m 1/60
U.S. Cl. 179—1 8 Claims

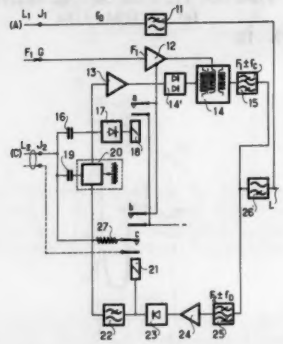


The effect of high level background noise on a loud-speaking telephone set is minimized by providing a microphone positioned to pick up the background noise and an output which is used to control the gain of a receive amplifier and the threshold level of a voice-operated send speech gate in the telephone set.

3,588,361
SYSTEM INCLUDING SUPPLEMENTARY TELEPHONE EXCHANGE EQUIPMENT

Jean Louis Hurault, 17 Rue, Bouilloux Lafont, Paris, France

Filed Mar. 17, 1969, Ser. No. 807,678
Claims priority, application France, Mar. 15, 1969, 144083
Int. Cl. H04h 1/08; H04j 1/00
U.S. Cl. 179—2.5 20 Claims

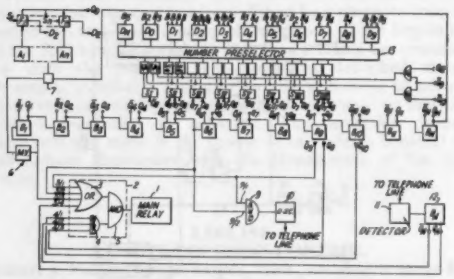


Simplified carrier current system providing an additional connection on a subscriber line, operating in amplitude modulation mode, in which the carrier frequency in the subscriber-exchange direction is synchronized with the frequency in the exchange-subscriber direction. In the additional extension set, ringing is obtained by a loudspeaker fed by an oscillator. Current consumption of the setup is zero under standby conditions and low in operation.

3,588,362
AUTOMATIC DIGITAL IMPULSE TRANSMISSION SYSTEM

Sholom Kass, 12 Herzog St., Rehovoth, Israel

Filed Sept. 24, 1968, Ser. No. 762,103
Claims priority, application Israel, Sept. 26, 1967, 28,681
Int. Cl. H04m 1/04
U.S. Cl. 179—5 8 Claims

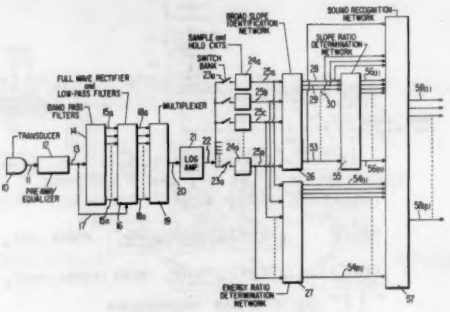


An automatic digital impulse transmission system particularly but not exclusively concerned with the automatic impulsing of telephone lines so as to actuate automatically automatic telephone dial exchanges. Thus, the invention is applicable to the automatic dialling of one or more telephone numbers in a predetermined sequence in response to the establishment of one or more alarm conditions. Alternatively, the invention is applicable to the provision of an automatic dialling mechanism, for office use which can be preset to a predetermined number of telephone numbers.

3,588,363
WORD RECOGNITION SYSTEM FOR VOICE CONTROLLER

Marvin Bernard Herscher, Camden, and Thomas Brooks Martin, Burlington, both of N.J., assignors to RCA Corporation

Filed July 30, 1969, Ser. No. 846,035
Int. Cl. G10l 1/00
U.S. Cl. 179—15A 10 Claims

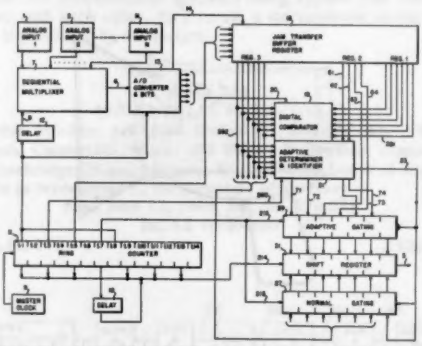


The invention herein described was made in the course of or under a contract or subcontract thereunder with the department of the Air Force. A speech recognition system wherein selected sounds are recognized by analysis of their spectral characteristics. Sounds are recognized on the basis of the broad slope characteristics, energy ratio characteristics and broad slope ratio characteristics of the amplitude-frequency spectrum of the input sounds. Sound recognition signals based on these characteristics are sequentially combined to recognize particular words.

3,588,364
ADAPTIVE ENCODER AND DECODER

Errol E. Wallingford, and Ronald Bruce Morris, Kingston, Ontario, Canada, assignors to Her Majesty the Queen in right of Canada as represented by the Minister of National Defense

Filed Apr. 30, 1968, Ser. No. 725,431
Claims priority, application Canada, June 19, 1967, 993315
Int. Cl. H04j 3/16
U.S. Cl. 179—15 23 Claims



A time-multiplexed encoding and decoding system for increasing average information encoded. Analog information from plural channels is converted into digital form and under "normal" conditions where the information is continually changing the channel are transmitted in a predetermined sequence. Under "adaptive" conditions where the informa-

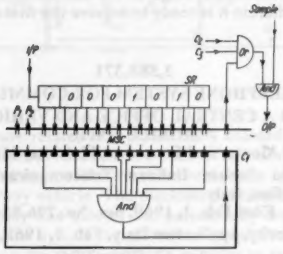
tion does not change or changes only partially between successive channels, signals from the normally scheduled channel are deleted and other signals substituted therefor.

3,588,365

SUBSCRIBER SUBSET FOR PCM TELEPHONE SYSTEM

Joseph Hood McNeilly, Harlow Essex, and Roger Alan Manship, Bishop's Stortford, England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed May 21, 1969, Ser. No. 826,448
Claims priority, application Great Britain, July 11, 1968, 33043/68
Int. Cl. H04j *3/08*
U.S. Cl. 179—15 **2 Claims**



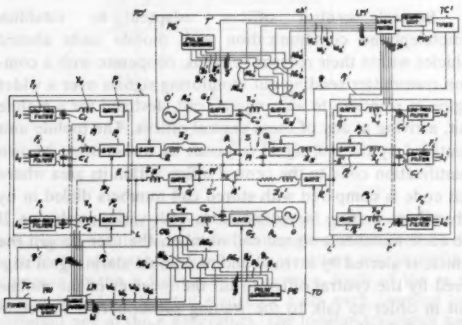
A subset is provided for use in a closed loop PCM telephone system. EAch subscriber set incorporates logic on a plug-in card for number detection. The plug-in cards may be transferred from one subset to another. Also one subset may have facilities for two or more cards and so enable a person visiting another subscriber to take his card with him and plug it in to that other subscriber's phone to insure that all calls for him are automatically transferred to the other subscriber's subset.

3,588,366

SIGNALING CIRCUITRY FOR TIME-SHARING TELECOMMUNICATION SYSTEM

Ferdinando Formenti, and Giuseppe Valbonesi, Milan, Italy, assignors to Societa Italiana Telecomunicazioni Siemens, Milan, Italy

Filed May 28, 1969, Ser. No. 828,487
Claims priority, application Italy, May 30, 1968, 17120A/68
Int. Cl. H04j *3/12*
U.S. Cl. 179—15 **8 Claims**



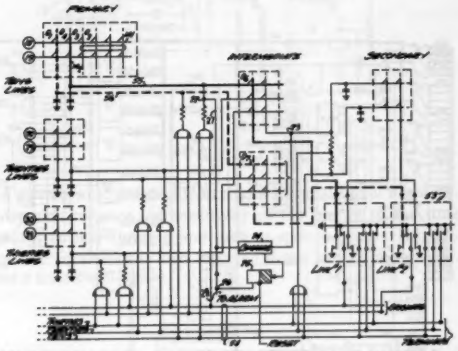
Communication–especially telephone–system with a plurality of local lines sequentially connectable to a common terminal for a brief sampling interval during which incoming message samples are stored on a condenser which immediately thereafter discharges through a filter into the corresponding local line. To signal a subscriber on the line, a continuous audiofrequency wave generated at the terminal is chopped into a train of brief pulses stored on a common capacitor between successive sampling intervals, this capacitor charging the line condenser of an individual subscriber only if, during the corresponding sampling interval, an enabling pulse coincides with a modulating pulse measuring a characteristic signaling period.

3,588,367

MONITOR AND ALARM CIRCUIT FOR SELF-SEEKING NETWORK

Stanley E. White, Crestwood; Eric G. Platt, Westmont, and Walter L. Olson, Villa Park, Ill., assignors to International Telephone and Telegraph Corp., New York, N.Y.

Filed Aug. 7, 1968, Ser. No. 750,860
Int. Cl. H04m *3/08*
U.S. Cl. 179—18 **5 Claims**



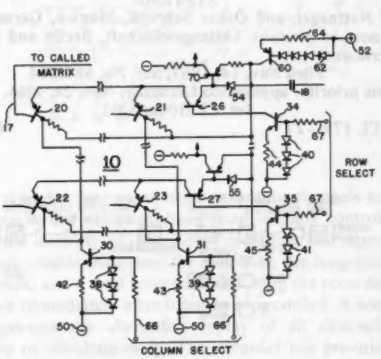
A comparison circuit monitors node points on possible paths through a switching network. When the network functions properly, substantially the same voltages appear at these node points regardless of whether the cross-points are turned on or off. When the potentials at these points are substantially different, it indicates a cross-point malfunction. An alarm is given and a clamping potential is applied to either enable or inhibit the faulty circuit, as required.

3,588,368

SPACE DIVIDED LINK CIRCUIT WITH HIGH IMPEDANCE CURRENT SOURCE

Frank J. Potter, Webster, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Nov. 4, 1968, Ser. No. 773,151
Int. Cl. H04g *3/50*
U.S. Cl. 179—18 **5 Claims**



A space divided link circuit for a telephone switchboard including transistors arranged in two pairs of matrices. Each

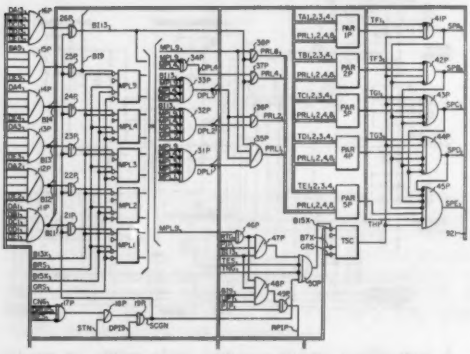
pair is coupled by a capacitor, and operating current is supplied to each matrix through the emitter-to-collector current path of a transistor in series with a diode. Off-hook conditions are detected by sensing changes in the voltage drop across the diode. The high collector impedance of the transistor minimizes shunting of the voice signals and maintains the insertion loss at a low value, while enabling the use of capacitive coupling in place of the less satisfactory transformer coupling heretofore proposed.

3,588,369

PRECEDENCE TRUNK SELECTION IN A CENTRAL PROCESSOR CONTROLLED COMMUNICATION SWITCHING SYSTEM

David K. K. Lee, Chicago, Ill., and Howard L. Wirsing, Wiesbaden, Germany, assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed May 28, 1969, Ser. No. 828,568
Int. Cl. H04m *3/38*
U.S. Cl. 179—18D **20 Claims**



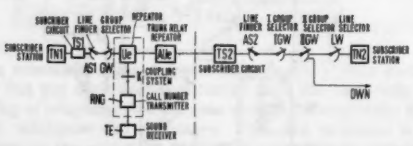
A translator and route selector of a central processor includes a common memory with a set of cores for each trunk to record its status as idle or busy at one of several possible levels of precedence. The route-selector includes a status circuit with a flip-flop for each possible level of precedence. During a first scan each flip-flop is set if a trunk is found at the corresponding status, and if an idle trunk is found it is selected. If none is selected a preempt control flip-flop is set, and the scan is repeated to select a trunk at the lowest level recorded by the status circuit.

3,588,370

SWITCHING CIRCUIT TO CONTROL CALL NUMBER TRANSMITTERS IN AUTOMATIC TELEPHONE SYSTEMS

Wolf Nottnagel, and Oskar Schrenk, Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Nov. 14, 1967, Ser. No. 682,884
Claims priority, application Germany, Nov. 24, 1966, s107094
Int. Cl. H04m *3/00*
U.S. Cl. 179—27 **6 Claims**



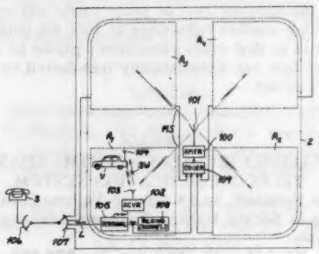
A switching circuit for use in conjunction with telephone systems wherein call number transmitters are employed to automatically establish connections between selected subscribers. A signal receiver is responsive to the receipt of signals, rather than the repetition rate thereof, to provide control criteria in conjunction with the switching state of the call number transmitter, to control the latter. The call number transmitter is thereby controlled to interrupt transmission of the call number upon receipt of a busy tone by the signal receiver, in order that the central control systems associated with the telephone exchange and the trunk are not seized for an unnecessary period of time and are therefore free for seizure by other subscribers. The transmission of the first digit of the call number is dependent upon receipt of an appropriate signal by the signal receiver, rather than upon the elapsing of a predetermined time period associated with switching the first dial stage of the associated exchange to a condition wherein it is ready to receive the first digit.

3,588,371

RADIOTELEPHONE SYSTEM FOR COMMUNICATION BETWEEN A CENTRAL OFFICE AND VEHICLE-BORNE MOBILE UNITS

Giorgio Dal Monte, and Francesco Motolese, Milan, Italy, assignors to Societe Italiana Telecomunicazioni Siemens S.P.A., Milan, Italy

Filed Feb. 3, 1969, Ser. No. 796,054
Claims priority, application Italy, Feb. 1, 1968, 12,280A/68
Int. Cl. H04g *7/04*
U.S. Cl. 179—41A **7 Claims**



Several central offices, adapted to establish radiotelephone communication with mobile units aboard vehicles within their respective areas, cooperate with a common transmitter sending out monitoring signals over a wider region in response to an outgoing call, destined for a mobile unit, arriving at any of these central offices. The mobile unit identified by the call signal responds by transmitting its own identification code to the central office within its area where that code is compared with stored call numbers dialed in by subscribers waiting for connections with various vehicles. If the code matches a stored call number, the user aboard the vehicle is alerted by a visual and/or audible alarm signal triggered by the central office to lift the receiver of the mobile unit in order to talk to the waiting subscriber; if the comparison fails, thus indicating that the call to the mobile unit originated at another central office or that the transmission of the code was initiated aboard the vehicle by a user wishing to communicate with another subscriber, a switching signal is sent out to condition the mobile unit for reception of the dial tone if the receiver thereof is in fact off the hook.

3,588,372

DEVICE FOR TRANSMITTING INFORMATION BETWEEN A FIXED LOCATION AND A RAILWAY VEHICLE

Christian Jauquet, Charleroi, Belgium, assignor to Ateliers De Constructions Electriques De Charleroi (ACEC) Societe Anonyme, Charleroi, Belgium

Filed Feb. 19, 1969, Ser. No. 800,580
Claims priority, application Belgium, Feb. 21, 1968, 54831
Int. Cl. H04b 5/00
U.S. Cl. 179—82 1 Claim

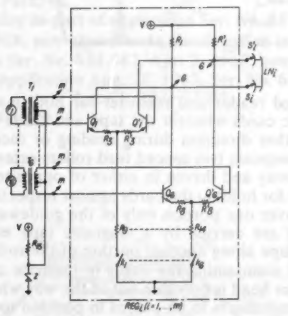
This disclosure relates to a periodically crossed cable loop which is positioned between two rails of a railway for permitting the exchange of information between a central location and a railway vehicle. The disclosure is characterized by the fact that only one side of the periodically crossed cable loop placed in the axis of the railway is coupled to an antenna positioned on the railway vehicle in order to reduce interference. The antenna is horizontal and disposed perpendicularly to said one side of the periodically crossed cable loop and symmetrically with respect thereto.

3,588,373

AC SIGNAL TRANSMISSION SYSTEM

Guido Maria Josepha Benedikt Thyssens, Wilrijk-Antwerpen, Belgium, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Jan. 18, 1968, Ser. No. 698,935
Claims priority, application Belgium, Jan. 25, 1967, 693,127
Int. Cl. H04m 1/50; H04q 9/12
U.S. Cl. 179—84 7 Claims



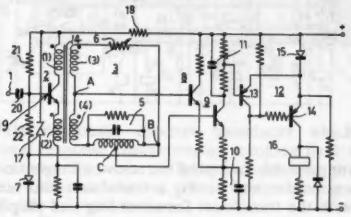
A multifrequency signal transmission system wherein the sending station includes *n* frequency generators each having a different frequency. Each of *m* registers are coupled in common to the *n* frequency generators. Each of the *m* registers include *n* longtail transistor pairs each coupled to a different one of the *n* generators. The longtail transistor pairs of an associated register each have their outputs coupled to a common transmission line. Bistable devices are coupled to each of the longtail transistor pairs of each register for activation of the longtail transistor pair to couple a given number of the *n* generators to the associated common transmission.

3,588,374

RECEIVER FOR SIGNALLING SIGNALS OF A FREQUENCY LYING IN THE SPEECH-FREQUENCY BAND

Gerrit Hendrik Van Hensbergen, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 27, 1969, Ser. No. 810,986
Claims priority, application Netherlands, Apr. 10, 1968, 6805157
Int. Cl. H04m 1/50
U.S. Cl. 179—84VF 6 Claims



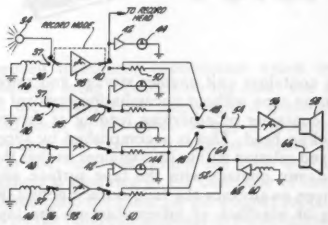
A device which responds to a tone control signal has a circuit which reduces the sensitivity of the circuit to the tone signal if an interfering signal such as speech occurs. In addition, the sensitivity is also reduced if the speech signal contains a tone burst signal.

3,588,375

MULTICHANNEL TAPE RECORDER WITH DOUBLE RECORDING PREVENTION MEANS

Carl L. Martin, Newport Beach, Calif., assignor to Leach Corporation, South Pasadena, Calif.

Continuation of application Ser. No. 622,717, Mar. 13, 1967, now abandoned. This application Jan. 14, 1970, Ser. No. 4,176
Int. Cl. G11b 15/04, 27/36
U.S. Cl. 179—100.2 6 Claims



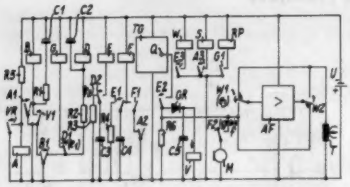
Tape recorder for two or more recording channels having a multitrack read-write recording head, volume controls for varying the intensity of the electric recording and reproducing signals, visible indicators for indicating the magnitude of such signals, and a read head for monitoring the recorded information immediately after it has been recorded. A selector switch permits the alternative replay of all channels individually or simultaneously. The recorder has provision to positively prevent the read-write recording head from recording any information if the tape has information already recorded thereon.

3,588,376

DICTATING MACHINE WITH MEANS TO PREVENT RECORDING ON PREVIOUSLY RECORDED TAPE

Carl-Heinz Jeske, Munich, Germany, and William E. Johnston, Los Angeles, Calif., assignors to Sub-Atlas-Werke GmbH,, Munich, Germany

Filed Aug. 24, 1967, Ser. No. 663,111
Int. Cl. G11b *15/04*
U.S. Cl. 179—100.2 7 Claims



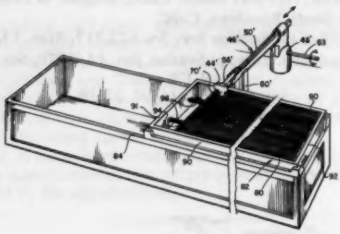
A dictating machine adapted to receive a magnetic recording medium carrier and having a transducer and means associated with the transducer for recording and playing back from the recording medium, respectively. The dictating machine also includes means for limiting the machine to its playback mode of operation for a fixed time interval at the beginning of the recording tape to determine whether or not information is recorded thereon.

3,588,377

CONTAINER FOR HOLDING MAGNETIC TAPE ON EDGE AND HANDLING DEVICE THEREFOR

Louis C. Meyer, Box 434, Rte. 1, Morrison, Colo. 80465

Filed Oct. 17, 1967, Ser. No. 675,809
Int. Cl. G11b *5/74, 23/08;* B65b *75/02*
U.S. Cl. 179—100.2 4 Claims



A tape container unit enables storage and retrieval of information on tape without necessitating removal of the tape from the container or otherwise feeding or driving the tape past a pickup head. This is accomplished by supporting the tape in fixed relation within its container so that the head can be moved into contact with the tape surface and the container driven to advance the tape surface across the head for recording or playback of information on the tape. Further the head can be accurately positioned at any desired location on the tape surface to permit random access of information without winding or rewinding the tape.

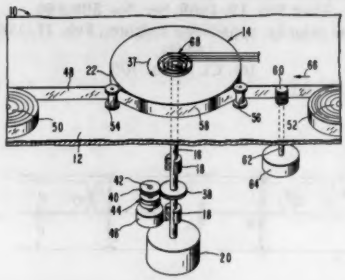
3,588,378

TAPE RECORDING AND REPRODUCING SYSTEM OF THE SKIP FIELD TYPE, WITH SEPARATE RECORDING HEAD

Arthur I. Protas, New York, N.Y., assignor to Cartridge Television, Inc., New York, N.Y.

Filed Aug. 20, 1968, Ser. No. 753,979
Int. Cl. G11b *5/52, 5/56;* H04n *5/78*
U.S. Cl. 179—100.2T 3 Claims

An improved apparatus and method for recording and reproducing electronic signals on a magnetic tape, wherein rotatable record and playback heads are utilized to scan oblique tracks on a movable magnetic tape. The record head, after a recording phase, is movable out of scanning relationship to a number of signal tracks on a movable magnetic tape and the playback heads are moved into such scanning relationship prior to the playback phase. The playback heads successively scan a single track for each revolution to permit tape conservation. Several embodiments of the apparatus of the invention can be used to change from the recording phase to the playback phase.

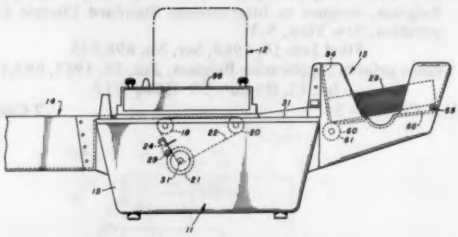


3,588,379

MAGNETIC CARD AND TAPE READER-RECORDER

Virgil F. Young, North Whittier, and Amable A. Pebenito, Los Angeles, Calif., assignors to Clary Datacomp Systems Inc., San Garriel, Calif.

Filed Jan. 13, 1969, Ser. No. 790,632
Int. Cl. G11b *25/10*
U.S. Cl. 179—100.2 7 Claims



A combined reader and recorder for both magnetic tape and magnetic cards wherein the tape and cards may be advanced in either direction during reading or recording. The apparatus comprises two spaced feed rollers extending across a card guideway and driven in either of opposite directions. Pinch rollers for holding the cards against respective feed rollers extend over one portion only of the guideway and other pinch rollers are carried by a magnetic tape magazine for guiding the tape along another portion of the rollers. A pressure pad for maintaining the cards in intimate contact with the transducer head is movable out of the way when the magnetic tape magazine is to be placed in position to process the tape.

3,588,380

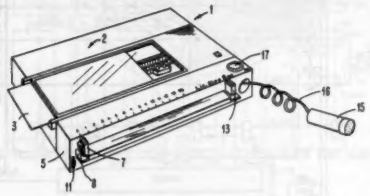
SWITCHING PARAMETERS FOR RECORDING/PLAYBACK OR MAGNETIC MEDIA HAVING DIFFERENT COERCIVITY AND/OR RETENTIVITY CHARACTERISTICS

Frank J. Horlander, and William R. Yount, Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 21, 1969, Ser. No. 809,321
Int. Cl. G11b *5/44*
U.S. Cl. 179—100.2K 4 Claims

Educational apparatus in the form of a recording/reproducing unit accommodates a record media com-

parable in size to the familiar IBM tabulation card. The media has printed information on one side such as questions and answers, circuit diagrams, etc. that is visible to the user when in operating position and recorded information on the opposite side positioned for scanning by a transducer during playback and record modes. One feature of the machine is to record and playback speech while using two distinctly different magnetic recording materials. The first material (master card) represents that used for the direct recording of master records. It is of high coercivity and high retentivity. The second material (copy card) has relatively lower mag-



netic properties. In order to record and reproduce with the two different materials on a common record/playback machine, the circuits controlling the high frequency bias and signal recording currents are changed depending in the type of material used. This is accomplished by electrical switching of either of two equalization as bias and preemphasis networks in the record circuits related to the master and copy media which occurs automatically whenever the respective media is inserted. The master media is intentionally overrecorded to compensate for nominal and extreme signal losses expected to be encountered when the master media is used as a source during a later magnetic transfer operation.

3,588,381

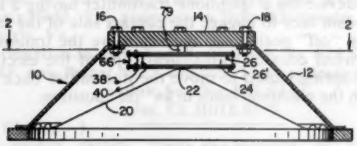
TRANSDUCER HAVING SPACED APART OPPOSITELY FLEXING PIEZOELECTRIC MEMBERS

Hugo W. Schafft, Des Plaines, Ill., assignor to Motorola Inc., Franklin Park, Ill.

Continuation-in-part of application Ser. No. 557;120, June 13, 1966, now abandoned , Continuation-in-part of application Ser. No. 634,642, Apr. 2, 1967, now abandoned. This application Aug. 28, 1967, Ser. No. 667,035

Int. Cl. H04r *17/00*

U.S. Cl. 179—110 **13 Claims**



An electroacoustic transducer having piezoelectric driving means consisting of first and second spaced apart bimorphs having a central portion and an edge portion. A spacer couples the same portion of each bimorph together. The other portion of each bimorph is coupled respectively to support means and a diaphragm. The bimorphs are electrically interconnected so that they flex in opposite directions. A further embodiment includes third and fourth spaced apart bimorphs operating similar to and directly attached to the first and second bimorphs.

3,588,382

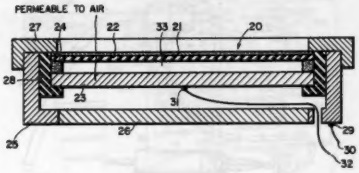
DIRECTIONAL ELECTRET TRANSDUCER

Cornelis W. Reedyk, Ottawa, Ontario, Canada, assignor to Northern Electric Company, Limited, Montreal, Quebec, Canada

Filed Oct. 13, 1967, Ser. No. 675,139

Int. Cl. H04r *19/04, 1/32*

U.S. Cl. 179—111E **9 Claims**



An electroacoustic electret transducer which exhibits directional response characteristics resulting from an electrical interaction between at least two discrete prepolarized volumes within an electret, the volumes having oppositely poled dipole moment vectors.

3,588,383

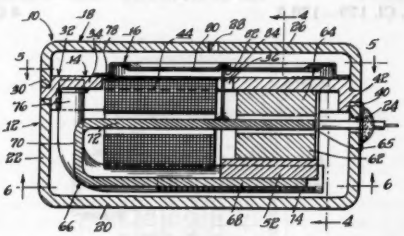
MINIATURE ACOUSTIC TRANSDUCER OF IMPROVED CONSTRUCTION

Elmer Victor Carlson, Prospect Heights; Floyd Warren Cross, Wheaton, and Mead Clifford Killion, Elk Grove Village, Ill., assignors to Industrial Research Products, Inc., Elk Grove Village, Ill.

Continuation of application Ser. No. 507,334, Nov. 12, 1965, now abandoned. This application Feb. 9, 1970, Ser. No. 9,111

Int. Cl. H04r *11/00*

U.S. Cl. 179—119A **8 Claims**



An improved transducer construction which includes a case, a bulkhead being mounted on the case, and a cover is secured to the bulkhead. A diaphragm is mounted on the bulkhead adjacent to the cover. A coil is mounted on the bulkhead within the case. A U-shaped magnet support is mounted on the bulkhead within the case and a pair of spaced magnets is mounted in the case, one of the magnets on the bulkhead and the other on the magnet support. A coil is mounted on the bulkhead adjacent to the magnets and a U-shaped armature reed has one end connected to one of the magnets through the magnet support and the other end of the armature reed extends through the coil and is positioned between the magnets.

3,588,384

HEADSET INCORPORATING A MICROPHONE AND AN EARPHONE

Marvin C. Negley, Clarinda, Iowa, assignor to Electro Voice, Incorporated, Buchanan, Mich.

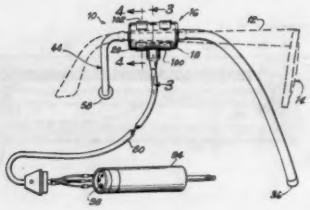
Filed Dec. 16, 1968, Ser. No. 784,101

Int. Cl. H04m *1/05;* **H04r** *1/28*

U.S. Cl. 179—156 **24 Claims**

A dynamic microphone transducer and an earphone transducer are mounted in front and rear half-shells which fit

together to form a casing. Sound is brought to the microphone transducer by a voice tube extending forwardly from the front half-shell. An ear tube is connected to the rear half-shell to carry the sound from the earphone transducer to the ear of the user. Porous discs made of sintered metal are preferably mounted in the tubes for damping resonances therein. The headset is supported by a mounting member



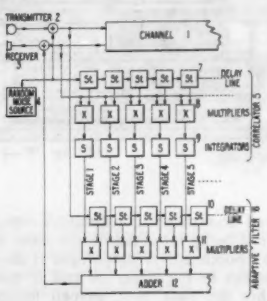
having front and rear clips of generally circular curvature for resiliently engaging the half-shells to hold them together. The half-shells are preferably formed with recesses for receiving the clips in substantially flush relation to the half-shells. The mounting member preferably includes a temple clip for mounting the headset on one of the temples of a pair of eyeglasses. A swivel joint is preferably provided between the temple clip and the front and rear clips.

3,588,385

ECHO SUPPRESSION IN LONG DISTANCE TELEPHONE CIRCUITS

Laurence Stanley Moye, London, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed May 2, 1967, Ser. No. 635,459
Claims priority, application Great Britain, May 6, 1966, 20132/66
Int. Cl. H04b *3/22*
U.S. Cl. 179—170.2 **4 Claims**



The invention cancels echoes in extremely long distant transmission channels. An electrical signal which is equivalent to the echo is generated, inverted, and added to a signal being received. Therefore, the equivalent echo signal cancels the real echo signal.

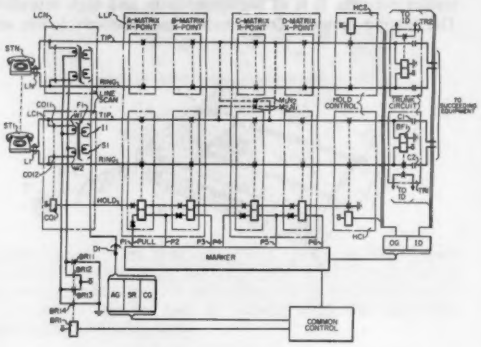
3,588,386

COMMUNICATION MATRIX TESTING ARRANGEMENT

Johannes Draayer, Wheaton, Ill., assignor to GTE Automatic Electric Laboratories, Incorporated

Filed July 30, 1969, Ser. No. 846,008
Int. Cl. H04m *3/10*
U.S. Cl. 179—175.21 **11 Claims**

A multistage cross-point switching network is disclosed for use in a program controlled communication switching system. The equipment includes ferrod and relay line scan circuitry for performing the conventional telephone functions as well as matrix testing under control of a central processor. The matrix tests involve a routine program and two network connections, one of which is connected to a trunk battery feed and the other one is connected to the ferrod scanner that has the battery feed reversed. This arrangement causes



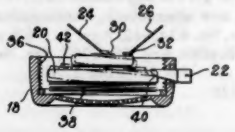
the ferrod associated with the second network connection to operate in response to a single contact between the two paths being stuck, due to the opposite polarities at the two ends, after which a normal scanner operation detects this operated ferrod and informs the common control of the identity.

3,588,387

CUTOFF DEVICE FOR TELEPHONE TRANSMITTER

Frank B. Smith, 105 Highland Ave., Harrington Park, N.J.

Filed Apr. 28, 1970, Ser. No. 32,630
Int. Cl. H04m *1/19*
U.S. Cl. 179—167 **2 Claims**



A cutoff device for a telephone transmitter having a lever arm with a cam face to engage the contact side of the transmitter, in an "off" position to thereby move the transmitter out of electrical contact with at least one of the electrical leads and a spring biased to move the transmitter back into contact with the electrical leads in an "on" position.

3,588,388

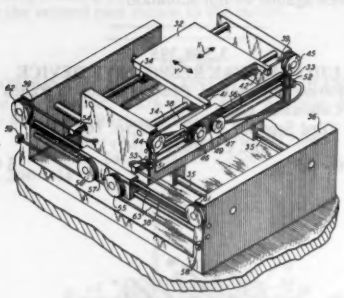
OPPOSED PULLEY ARRANGEMENT FOR ELIMINATING THE TENSION OF AN ELECTRICAL CABLE CONNECTED TO A MOVABLE TABLE

Richard A. Harris, Greensboro, N.C., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed Oct. 7, 1969, Ser. No. 864,439
Int. Cl. H02g *11/00*
U.S. Cl. 191—12R **2 Claims**

A plurality of cables and/or air hoses are connected to a movable table by an opposed pulley arrangement to prevent the cables from applying tension to the table. A pair of cables extend in opposite directions from the table over first pulleys mounted on a frame and over second pulleys mounted on a

block slidably mounted on the frame. The two cables produce opposite and equal tension on the movable table.

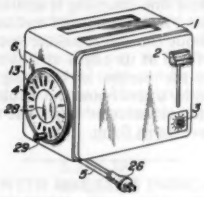


The slidable block moves opposite and one-half the distance of the table.

3,588,389
TOASTER

Hosei Sato, Nishinomiya-shi, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 17, 1969, Ser. No. 799,780
Claims priority, application Japan, Feb. 26, 1968, 43/15011
Int. Cl. H02g *11/00*
U.S. Cl. 191—12.2 **5 Claims**



A bread toaster which has a cord accommodating space formed in a sidewall of a main casing, with cord winding means provided therein, so that a cord may be drawn from said space in a desired length when the toaster is to be used for toasting bread and taken up by the cord winding means after the toaster has been used, whereby handling of the toaster is facilitated.

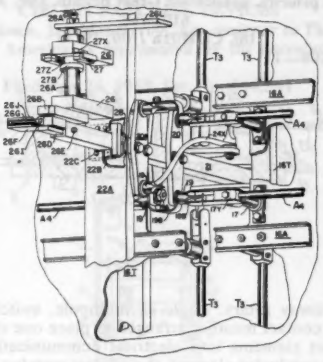
3,588,390
MATRIX-TYPE BALANCED LINE SWITCH SYSTEM

Stephen W. Kershner, Falls Church, and Kenneth Owen, Springfield, Va., assignors to Delta Electronics, Inc., Alexandria, Va.

Continuation-in-part of application Ser. No. 628,501, Apr. 4, 1967, now Patent No. 3,400,005. This application Sept. 25, 1969, Ser. No. 861,044
Int. Cl. H01h *9/00*
U.S. Cl. 200—1 **10 Claims**

A switch system using a plurality of multicontact reciprocating switch plungers to selectively connect any one of a plurality of multiconductor lines running in one direction to any one of a plurality of multiconductor lines running in a transverse direction with each plunger switch unit and its cooperating contacts being made in a module whereby a switch system of any number of switches can be readily assembled, particularly for the purpose of connecting any one of a plurality of transmitters to any one of a plurality of directional antennas for directing radio waves in a particular direction as required.

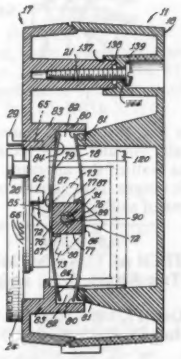
Provision is made for shielding the conductor lines, whether a multiconductor line or a single conductor line, by means of shielding channels arranged with their backs in supporting engagement and fixed together providing the framework for the switch system. Suitable insulators are provided for supporting the multiconductor or single conductor lines in proper relation and the plunger switch unit serves to make the necessary connections without leaving an objectionable line stub on the energized portion of the lines.



3,588,391
PLUG-IN TWENTY-FOUR HOUR TIME SWITCH

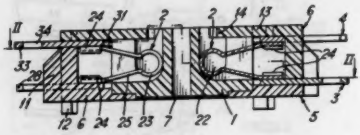
Eugene D. Banathy, Skokie; Julius R. Rosenski, Chicago, and Claude Jerome Sechrist, Lombard, Ill., assignors to International Register Company, Chicago, Ill.

Filed Sept. 29, 1969, Ser. No. 861,978
Int. Cl. H01h *19/00, 7/08;* **H01b** *43/10*
U.S. Cl. 200—6BB **14 Claims**



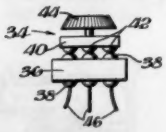
A two part insulating housing has a 24 hour time dial rotatably mounted thereon and driven by a synchronous motor within the housing. Adjustable time-on and time-off members on the dial operate radial arms from a square cam which rotates about an axis transverse to the axis of the dial to open and close switch contacts at the preset times. Leaf springs react against opposite sides of the square cam to operate the contacts with a snap action and to floatingly support the cam and contact operating shaft connected thereto. Spring contacts of an outlet socket are energized on closure of the switch contacts. Plug-in contact terminals are energized from a conventional wall socket. The mechanism in the housing is assembled on the rear side of the front housing and is held in place principally by bosses extending from the front side of the rear housing.

3,588,392
ROTARY ELECTRICAL SWITCHES AND CONTACT MEMBERS THEREFOR
John Anthony Cartwright, Northampton, England
Filed Jan. 10, 1969, Ser. No. 790,332
Claims priority, application Great Britain, Dec. 31, 1968, 61929/68
Int. Cl. H01h *1/06, 19/58*
U.S. Cl. 200—11 **7 Claims**



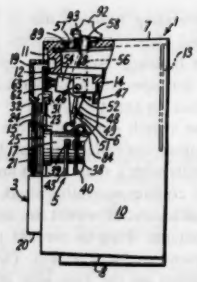
A multiway rotary, single or multipole, switch having a movable contact member arranged to place one of a number of contact elements into electrical communication with at least one conductor element, the contact member having two contact wipers, one of said wipers having a wiping width greater than the distance between the contact portions of adjacent contact elements whilst the other wiper has a width less than said distance so that by appropriate positioning of the contact member with respect to the other switch components such switch may be formed with one of two particular switching characteristics.

3,588,393
ELECTRICAL INTERCONNECTION DEVICE
Vernon V. Hukee, Nashua, N.H., assignor to Sprague Electric Company, North Adams, Mass.
Filed Feb. 28, 1969, Ser. No. 803,224
Int. Cl. H01h *1/00;* **H05k** *1/04*
U.S. Cl. 200—11 **6 Claims**



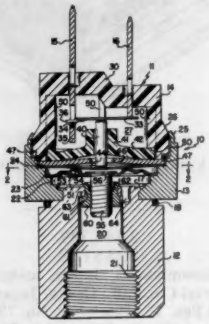
A ceramic plate has, through its narrowest dimension, an aperture of generally circular cross section. A silver mass is melt-bonded to the wall of the aperture. The volume of said mass is such that it ranges from considerably move to slightly less than the volume of said aperture.

3,588,394
SWITCH ACTUATING MEANS
Claude V. Koch, Two Rivers, Wis., assignor to AMF Incorporated
Filed Oct. 17, 1969, Ser. No. 867,308
Int. Cl. H01h *3/00, 43/14*
U.S. Cl. 200—18 **8 Claims**



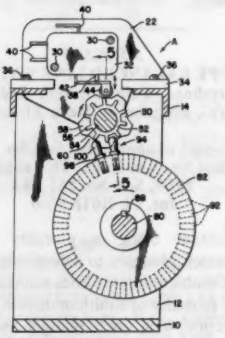
Switch actuating means comprising a manually operable lever and a wireform cam follower member connected to or mounted on the lever for automatic switch actuation; said cam follower acting to pass ON and OFF cams when the lever is locked against switch actuation.

3,588,395
FLUID PRESSURE RESPONSIVE DEVICE
Harold E. Hersey, Columbus, Ohio, assignor to Ranco Incorporated, Columbus, Ohio
Filed Sept. 27, 1968, Ser. No. 763,232
Int. Cl. H01h *35/40*
U.S. Cl. 200—83 **5 Claims**



An electric switch enclosed in a housing adapted to be threaded onto a fluid line coupling is actuated by a reversing form-type snap disc which is engaged and moved by an annular corrugation about the intermediate section of a flexible metal diaphragm fixed at its edges and center and subjected to fluid pressure, the center of the diaphragm being adjustably positioned by a screw and nut structure to accurately determine the fluid pressures at which the diaphragm causes the snap disc to reverse its form.

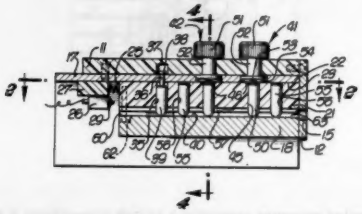
3,588,396
ROTARY STEPPING PROGRAMMER WITH IMPROVED CAMMING MEANS
Gary D. Fredell, East Moline, Ill., assignor to Gulf & Western Industries, Inc.
Filed May 1, 1969, Ser. No. 820,851
Int. Cl. H01h *7/08, 43/10*
U.S. Cl. 200—38 **8 Claims**



A rotary stepping programmer for controlling a plurality of machine operations in a predetermined sequence, comprising: a frame; a motor secured to the frame; a plurality of switch means mounted on the frame for controlling the

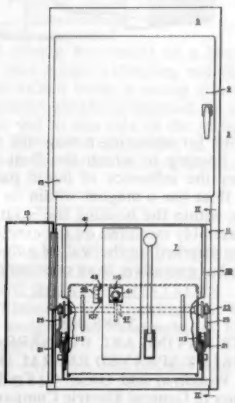
machine operations; first cam means for alternately actuating and deactuating the switch means; second cam means for periodically rotating the first cam means; and means for connecting the second cam means to the motor.

3,588,397
COMBINATION CARD UNLOCK MECHANISM
Clarence L. Ellefson, Burbank, Calif., assignor to Part-O-Matic Mfg., Inc., Burbank, Calif.
Filed Nov. 17, 1969, Ser. No. 877,083
Int. Cl. H01h 27/00
U.S. Cl. 200—44 12 Claims



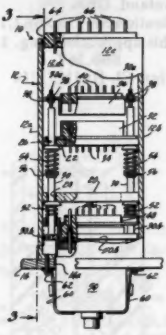
A card actuated switch wherein a movable plate is provided with a locking pin bore and control pin bores, which, when a card is inserted having the right combination of projections on it, is moved against a switch armature. In a set of cards all of which are provided with a projection for releasing the single locking pin, some are provided with a projection at the location of one control pin and some with a projection at the location of another control pin, so that a control knob for one or another of the control pins can be set in one position to block movement of the movable plate and in another position to permit movement of the movable plate.

3,588,398
SWITCHGEAR WITH POSITION INDICATING MEANS
George Siviy, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Nov. 24, 1969, Ser. No. 879,190
Int. Cl. H01h 9/20
U.S. Cl. 200—50 10 Claims



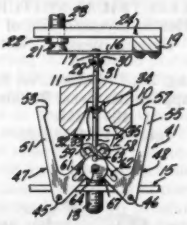
Drawout-type switchgear comprises improved means providing a visual indication of the "disconnected," "test" and "connected" positions of a drawout circuit interrupting unit in a cell.

3,588,399
CIRCUIT PATCHING DEVICES
Harry L. Viosca, Jr., Mandelville, La., assignor to The United States of America as represented by the Secretary of the Navy
Filed July 24, 1969, Ser. No. 844,541
Int. Cl. H01r 33/30
U.S. Cl. 200—51.1 5 Claims



Multiconductor circuit patching connection devices for making alternative connections of electrical equipment are described. A first plug, normally engaged with a first receptacle, is disengaged therefrom by means actuated by insertion of a second plug into a second receptacle. Withdrawal of the second plug actuates means for restoring engagement of the first plug with the first receptacle.

3,588,400
INERTIA SWITCH
Arcadio Espasa Fanes, Calle Peligro 40, Barcelona, Spain
Filed Apr. 22, 1969, Ser. No. 818,217
Claims priority, application Spain, Oct. 25, 1968, 359529
Int. Cl. H01h 35/14
U.S. Cl. 200—61.45 18 Claims



An inertia switch including a massive inertia element movable through an articulated connection collapsible from an extended condition in response to abrupt changes in velocity to actuate the switch. A pair of pivotal arms of the articulated connection extend, in a stable position, in end-to-end relationship between a mounting point and a resilient conductive member. The pivotable arms abut at planar end surfaces thereof, propping the resilient member in its uppermost position. The inertia element is supported on the uppermost arm and forces applied to the pivotable arms in their stable position by the bias of the resilient member and the weight of the inertia element extend along the arms to the mounting point. Abrupt velocity changes pivot the arms from their stable alignment under the influence of the inertia ele-

ment, allowing movement of the resilient member for switch actuation. Resetting levers are engageable with the inertia element for returning the inertia element and pivotable arms to their central stable position and current bypass provisions protect the resilient member from excessive currents.

3,588,401

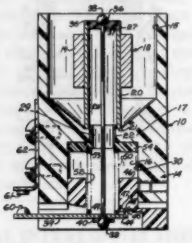
INVERTED PENDULUM OSCILLATING CONTROLLER IMPACT SWITCH WITH DECREASING RETURNING FORCES ACTING UPON THE PENDULUM AS IT PIVOTS FROM ITS NORMAL POSITION

Charles O. Berryman, Detroit, Mich., assignor to Eaton Yale & Towne Inc., Cleveland, Ohio

Continuation of application Ser. No. 662,137, Aug. 21, 1967, now abandoned. This application Aug. 14, 1969, Ser. No. 850,267

Int. Cl. H01h *35/14*

U.S. Cl. 200—61.48 **3 Claims**



A switch mechanism in which a biasing spring is connected to a movable member whose inertia actuates the switch through a connection whose mechanical advantage decreases as the movable member moves relative to its support toward a switch operated position and in which the total forces opposing movement to the switch operating position decrease as the movable member approaches a position in which the switch is operated. This decreasing mechanical advantage is a result of connecting a nonextensible means to the movable member at a point spaced from the planar surface and outwardly of the center of gravity of the movable member. The movable member may move in a plurality of directions.

3,588,402

ELECTRICAL SWITCH

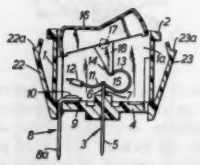
Clarence Willans Heath, deceased late of Ivy Eveline Heath, Heir, Sycamore House, Bleasby, Nottinghamshire, England

Filed Aug. 25, 1969, Ser. No. 852,995

Claims priority, application Great Britain, Aug. 26, 1968, 40706/68

Int. Cl. H01h *13/36*

U.S. Cl. 200—67 **4 Claims**



A rocker switch comprises a rockably mounted actuating member adapted to be rocked into opposed positions to open and close the switch under the action of a snap-over leaf spring, the actuating member being pivoted supported by lugs engaging apertures in the sidewalls of the switch casing, the lugs having portions of their periphery shaped to make line contact with the walls of the apertures.

3,588,403

TIME-LAG PRESSURE RESPONSIVE SWITCHES

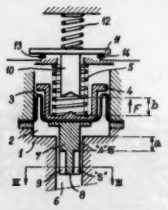
Jean Piret, Billancourt, France, assignor to Regie Nationale Des Usines Renault, Billancourt, France and Automobiles Peugeot, Paris, France

Filed Jan. 6, 1969, Ser. No. 789,300

Claims priority, application France, Jan. 19, 1968, 136,766

Int. Cl. H01h *35/40*

U.S. Cl. 200—83 **4 Claims**



A timelag pressure responsive switch comprising a pressure chamber closed by a flexible diaphragm of which the movable portion is displaceable against the resistance of an antagonistic spring for actuating a rod controlling a back contact, characterized in that it comprises a timelag device for retarding the opening of said contact and adjusting the rate of delivery of the fluid under pressure to said chamber for actuating said pressure responsive switch, the timelag characteristic of this device increasing with the fluid viscosity while preserving the fast opening contact characteristic.

3,588,404

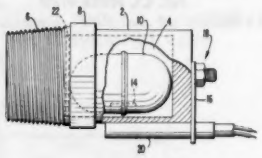
MAGNETIC FLOAT REED SWITCH POINT SENSOR

Lloyd T. Akeley, Charlestown, N.H., assignor to Simmonds Precision Products, Inc., Tarrytown, N.Y.

Filed May 9, 1969, Ser. No. 823,402

Int. Cl. H01h *35/18*

U.S. Cl. 200—84 **5 Claims**



A float switch for operating a magnetic reed switch utilizing a hollow housing in which the float member is freely movable under the influence of liquid passing through the housing. The float has a magnet within its interior and for a given position within the housing the magnet will energize a reed switch assembly mounted on the exterior of the housing. The housing is installed on the wall of a liquid container by a threaded member extending from one end of the housing.

3,588,405

ARC CHUTE HAVING ARC RUNNERS COATED WITH THERMALLY SPRAYED REFRACTORY METAL

Cecil Bailey, Woodlyn, and Oscar C. Frederick, Springfield, Pa., assignors to General Electric Company

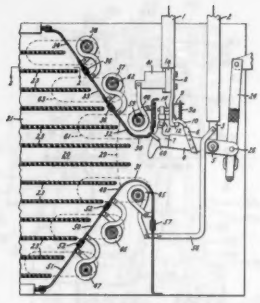
Filed Sept. 3, 1968, Ser. No. 756,863

Int. Cl. H01h *33/18*

U.S. Cl. 200—144 **12 Claims**

Discloses an arc chute comprising insulating sidewalls and spaced-apart metal runners providing paths along which the terminals of an arc travel as the arc moves into the chute.

One of the runners comprises a strip of conductive material and a coating of thermally sprayed refractory metal bonded



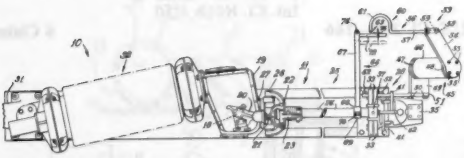
to a surface of the strip to define at its exposed side an arc-running surface.

3,588,406

HIGH VOLTAGE BEAVER TAIL TYPE SWITCH WITH PREINSERTION RESISTOR

Joseph Bernatt, Arlington Heights, Ill., assignor to S & C Electric Company, Chicago, Ill.

Filed Nov. 1, 1968, Ser. No. 772,526
Int. Cl. H01g *33/16*
U.S. Cl. 200—144 **1 Claim**



During the final closing movement of a beaver tail type switch conducting arm means extending radially from near the distal end of the switch blade is swung into juxtaposition with terminal conductor means connected to a resistor assembly mounted on and to one side of the stationary switch contact to connect the resistor assembly in series with the switch blade and limit the inrush current incident to closing of the switch.

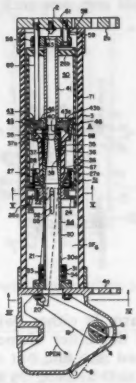
3,588,407

PUFFER PISTON GAS BLAST CIRCUIT INTERRUPTER WITH INSULATING NOZZLE MEMBER AND VALVE ACTING HOLLOW CONTACTS

Russell E. Frink, Pittsburgh, and Stanislaw A. Milianowicz, Monroeville, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 31, 1967, Ser. No. 657,122
Int. Cl. H01h *33/88, 33/91, 33/86*
U.S. Cl. 200—148 **13 Claims**

A gas-blast circuit interrupter of the puffer piston type is provided having a pair of vented separable contacts, which make valve-closed engagement in the closed position. An operating linkage is provided with a lost motion mechanical connection between the piston means and the moving contact, so that gas pressure is built up prior to contact part. The contacts separate within an insulating nozzle member, which



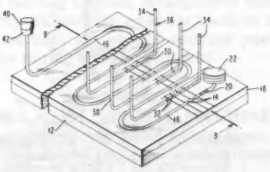
guides all of the gas flow through both vented contacts, when they part due to the takeup of the lost motion.

3,588,408

PULSE SWITCHING APPARATUS

William F. Beausoleil, and Edward C. Uberbacher, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 26, 1969, Ser. No. 836,912
Int. Cl. H01h *29/00*
U.S. Cl. 200—152 **12 Claims**



A printed circuit on a circuit board is arranged to give a sequential pulse output when the circuit is completed. A channel is attached to the circuit board so as to cross various circuit lines. At each cross point between a circuit line and the channel, there is a gap in the circuit such that the gap can be bridged by a conductive pellet travelling through the channel thus completing the circuit to provide the pulse output. The device can be programmed or preconditioned by providing a second channel which crosses the circuit lines and which has gaps in the circuit lines where the second channel crosses. A reservoir of conductive material is connected to the second channel and is adapted to be energized in accordance with an associated device such as a cammed counter wheel. The conductive material rises and ebbs in the second channel in accordance with pressure applied to the reservoir thus bridging a corresponding number of gaps. The conductive pellet, as it passes through the first channel, produces pulses at the output by completing the circuits of only those circuit lines which are preconditioned by having the second gaps in the second channel bridged by the conductive material therein.

3,588,409

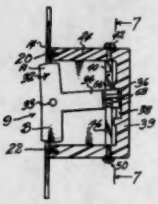
TAP SWITCH WITH BLIND SLOT FOR GUIDING THE ACTUATOR

Lauri A. Lattinen, 34835 Ave. F., Yucaipa, Calif.

Filed Mar. 3, 1969, Ser. No. 803,603
Int. Cl. H01h *23/24, 23/02*
U.S. Cl. 200—153LA **2 Claims**

A substantially flush-with-the-wall tap switch comprising a three armed T-shaped dielectric rocker pivotally mounted

within a dielectric housing, the inner end portion of the switch actuating arm of the rocker being confined and guided by a blind slot formed in the back wall of the housing. Metallic spring elements are biased against opposite cam contoured side faces of said arm, one such element comprising a



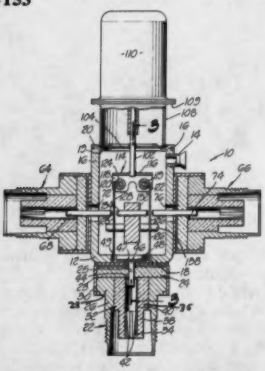
detent holding said arm in either switch opening or switch closing position and the other element including a switch point which is cammed into and out of contact with a fixed contact point within said housing by the cam action of said arm as the latter shifts between said two positions.

3,588,410

VACUUM COAXIAL RELAY WITH TANDEMLY MOVABLE CONTACTS AND STATIONARY GROUNDING CONTACTS

Orhan A. Guraydin, and Knute W. Magerkurth, San Jose, Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Jan. 23, 1969, Ser. No. 793,321
Int. Cl. H01p *1/10;* **H01h** *33/66, 45/14*
U.S. Cl. 200—153 **10 Claims**



The disclosure relates to a coaxial relay wherein a pair of contacts are movable in tandem in a vacuum environment. When one contact connects a common terminal to a first output terminal the other contact is connected to ground thus isolating the energy which may be coupled to a second output terminal. Further, when the common terminal is connected to the second output terminal the first contact isolates the first output terminal in a similar manner. The contacts are made of a thin flexible metal mounted on a saddle which is connected to a shaft. Movement of the shaft is transferred through the saddle to the contact, causing the desired switching to occur.

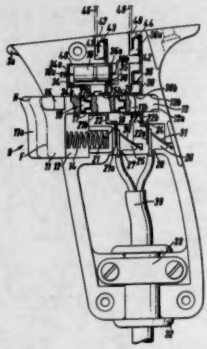
3,588,411

POWER TOOL SWITCH AND SPEED CONTROL WITH CONTROL ELEMENTS MOUNTED IN RECESSES IN THE TOOL HANDLE

Edgar A. P. Milcoy, Cookham, England, assignor to Arrow-Hart Inc., Hartford, Conn.

Filed July 3, 1968, Ser. No. 742,411
Int. Cl. H01h *9/06, 13/08*
U.S. Cl. 200—157 **3 Claims**

In an electrically driven appliance of the kind comprising a body serving as a housing for an electric driving motor and as a support for a member driven by the motor, and a manually operable controls means mounted on or in the body for controlling operation of the motor, a component part of the body of the appliance is formed as an electrically insulating



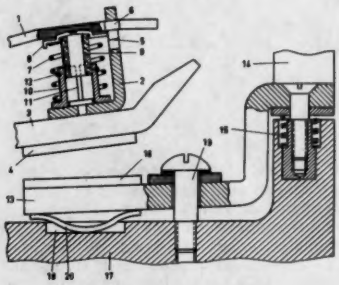
casing in which individual elements of said control means are mounted. The component part may be a handle of the appliance and the elements of said control means may include elements of a switch and a device for controlling the speed of the motor of the appliance.

3,588,412

SWITCH DEVICE INCLUDING DAMPING MEANS

Wolfgang Koennecke, Bad Homburg, vor der Hohe, and Gerhard Schleifenbaum, Huttental-Weidenau, Germany, assignors to Hundt & Weber G.m.b.H., Huttental-Geisweid, Germany

Filed Mar. 4, 1969, Ser. No. 804,156
Claims priority, application Germany, Mar. 7, 1968, P 16 40 431.2
Int. Cl. H01h *1/50*
U.S. Cl. 200—166 **6 Claims**



A switch device for relatively high-capacity electrical circuits. The switch device eliminates certain undesirable characteristics of the switching operation by damping the contact of the closing members.

3,588,413

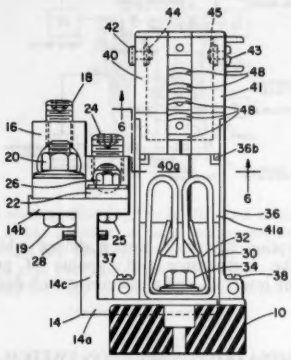
TERMINAL STRAP, CONTACT JAW MEMBER, AND CONNECTOR ASSEMBLY FOR ELECTRICAL SWITCH

Harris I. Stanback, Lexington, Ky., assignor to Square D. Company, Park Ridge, Ill.

Filed May 9, 1969, Ser. No. 823,259
Int. Cl. H01h *1/00*
U.S. Cl. 200—166 **4 Claims**

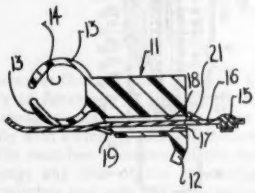
The terminal strap includes a rear platform normally mounted adjacent a rear wall of an enclosure for the switch,

a front platform, and a connecting portion joining the front and rear platforms. A stationary contact jaw member is secured to the rear platform. A pair of connectors, each including a connector body having a clamping screw



threadedly mounted therein, are secured to the front platform respectively by a pair of captive bolts having head portions disposed rearwardly of the front platform respectively on opposite sides of the connecting portion in nonrotatable relationship therewith.

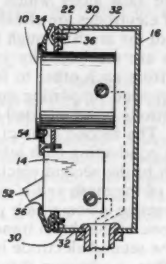
3,588,414
CONTACT BREAKER ASSEMBLIES
Alfred Donald Prickett, Birmingham, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England
Filed July 24, 1969, Ser. No. 844,281
Claims priority, application Great Britain, Aug. 9, 1968, 38070/68
Int. Cl. H01h *1/00*
U.S. Cl. 200—166 **1 Claim**



A contact breaker assembly for use in an ignition distributor of a road vehicle includes a fixed contact and a movable contact movable into and out of engagement with the fixed contact. The movable contact is carried by an insulating heel member which is engageable in use by the cam of a distributor, and a leaf spring urges the insulating heel member to pivot in a direction to engage the movable contact with the fixed contact. The movable contact is secured to one end of the leaf spring, and the leaf spring extends through a passage in the insulating heel member and is engaged with the heel member as a snap fit.

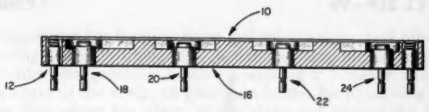
3,588,415
COMBINATION CLOCK AND SWITCH
Daniel R. Berne, 144-61 Village Road, Jamaica, N.Y.
Filed Mar. 17, 1969, Ser. No. 807,680
Int. Cl. H01h *9/02*
U.S. Cl. 200—168 **6 Claims**

In combination, a clock and a light switch assembly are mounted in a suitable housing therefor. The housing is provided with a face plate sized to be secured over an opening in the housing so that apertures provided in the face plate receive the clock and the light switch assembly. A decorative strike plate is disposed over the housing, being positioned adjacent to the face plate to expose the clock and switch of the light switch assembly. An electrical circuit associated with the clock and the light switch assembly permits the operation of the light switch assembly to be selectively interrupted while the operation of the clock remains undisturbed. If



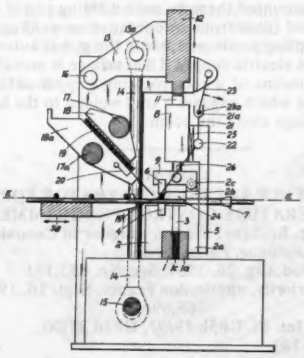
preferred, the light switch assembly may be replaced by a socket assembly.

3,588,416
TAUT WIRE MOVING CONTACT MOUNTING ARRANGEMENT
Gerald J. Millam, Freeport, Ill., assignor to Honeywell, Inc., Minneapolis, Minn.
Filed July 25, 1969, Ser. No. 844,943
Int. Cl. H01h *1/24*
U.S. Cl. 200—166 **4 Claims**



A taut wire moving contact arrangement that allows for manual assembly without the need for tools or conventional fasteners and includes an integral resilient portion to limit stress in the wire during actuation thereof.

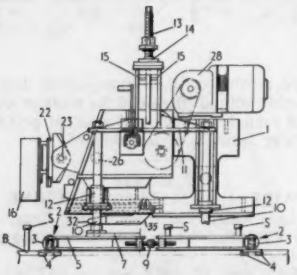
3,588,417
WIRE MESH WELDING MACHINE
Hans Gott; Josef Ritter, and Klaus Ritter, Graz, Austria, assignors to EVG Entwicklungs-u. Verwertungsgesellschaft, Graz, Austria
Filed Sept. 12, 1969, Ser. No. 857,363
Claims priority, application Austria, Oct. 14, 1968, 10032/68
Int. Cl. B21f *15/08, 27/10*
U.S. Cl. 219—56 **13 Claims**



A wire mesh welding machine of the kind in which there are two rows of welding electrodes extending across the machine and the longitudinal wires of the mesh are moved step by step between the electrodes to enable the transverse wires to be welded to them, has its electrodes arranged so that their spacing is continuously variable to enable the spacing of the longitudinal wires of the mesh to be varied. For

this purpose the machine has thrust transmitting devices for applying a welding thrust to the electrodes mounted so that they can be shifted in position across the machine and it also has electric conductor rails along which a pair of contact shoes for each pair of electrodes are slidably mounted below the plane of advance of the mesh through the machine. Each pair of contact shoes are mechanically joined together but electrically insulated from each other to form a single structural unit, one contact shoe supporting one electrode of the pair and this first electrode being situated below the plane of advance of the mesh. The second contact shoe is connected electrically through a conducting path which passes through the plane of the mesh to the second electrode which is situated above the plane of the mesh and is connected mechanically through a connecting piece which passes through the plane of the mesh to one of the thrust transmitting devices by which a support for the second electrode is movable upwards and downwards. Further, a common thrust beam which extends across the machine is provided for applying a thrust to all the thrust transmitting devices.

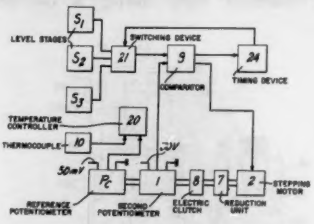
3,588,418
AUTOMATIC WELDING APPARATUS
Edward Chiffey, Bolton, England, assignor to Robert Watson & Company (Constructional Engineers) Limited, fractional part interest
Filed Feb. 5, 1969, Ser. No. 796,735
Claims priority, application Great Britain, Feb. 7, 1968, 5994/68
Int. Cl. B23k *9/20*
U.S. Cl. 219—98 **7 Claims**



An automatic welding apparatus for welding studs to a beam comprising a wheeled carriage having a number of welding guns mounted thereon, each welding gun is arranged to be raised and tilted from an operative or welding position to a stud accepting position in which the gun is automatically cut off from its electric supply. The carriage is movable along the beam by means of a reciprocating gripper arrangement on the carriage which engages a stud welded to the beam and drags the carriage along the beam.

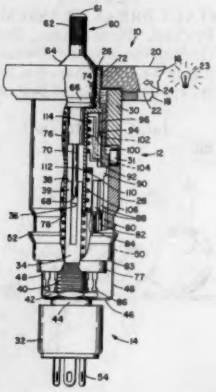
3,588,419
REFERENCE VOLTAGE GENERATOR FOR A TEMPERATURE CONTROL PROGRAMMER
Pierre Rongier, Bretigny, France, assignor to Commissariat A L'Energie Atomique, Paris, France
Filed Aug. 26, 1969, Ser. No. 853,151
Claims priority, application France, Sept. 10, 1968, 165,694
Int. Cl. G05b *19/02*; **G05d** *23/00*
U.S. Cl. 318—163 **4 Claims**

The generator is designed to produce a reference voltage in compliance with a predetermined program and is particularly applicable to a programmer for a temperature controller. The generator comprises a reference potentiometer, a motor which actuates said potentiometer, a device which controls the speed of the motor and provides *n* selectable speeds, a voltage-generating device which is capable of producing *n* selectable reference voltages, a comparator having two inputs in which the first input receives the voltage delivered by the potentiometer and the second input receives in succession one of the *n* reference voltages supplied by the



voltage-generating device, a timing device which is controlled by the comparator and capable of producing *n* selectable time intervals, and a selector-switch device.

3,588,420
ILLUMINATED PUSHBUTTON SWITCH AND POTENTIOMETER ASSEMBLY
Richard A. Conrad, Canoga Park, Calif., assignor to Switchcraft, Inc., Chicago, Ill.
Filed June 26, 1968, Ser. No. 740,156
Int. Cl. H01n *9/18*
U.S. Cl. 200—167 **7 Claims**

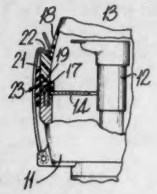


An illuminated pushbutton switch and potentiometer assembly is disclosed. The switch is mountable in a light transmitting panel and has a pushbutton actuator that is shielded from the light in an outer position and unshielded when in an inner position so that light is reflected from the pushbutton actuator when in its inner position. Additionally, the pushbutton actuator is rotatably keyed to a potentiometer for controlling the potentiometer in either the inner or outer position.

3,588,421
IGNITION DISTRIBUTOR CASING AND SEALING MEANS THEREFOR
Albert Herbert Ball, Walsall, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England
Filed Apr. 2, 1969, Ser. No. 812,659
Claims priority, application Great Britain, Apr. 5, 1968, 16,516/68
Int. Cl. H01h *9/04*
U.S. Cl. 200—168 **4 Claims**

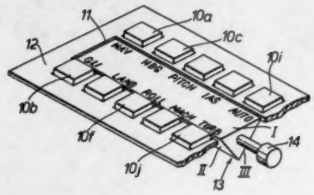
An ignition distributor including a hollow casing which is closed at one end by a detachable cap. The cap is secured to the casing by pivotable clips, and the casing supports a contact breaker assembly. The contact breaker assembly includes a base plate having tags which are received in slots in

the wall of the casing, and the cap includes portions which engage in said slots to close said slots. However, owing to manufacturing tolerances the cap does not completely close said slots, and a pair of sealing members are provided for



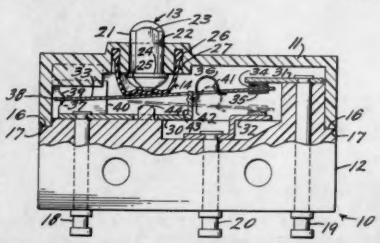
sealing said slots against ingress of dirt and moisture into the mechanism of the distributor. Said sealing members are positioned between the clips and the casing covering said slots and the clips urge the sealing members into engagement with the casing and the caps so that said slots are sealed.

3,588,422
MULTIFUNCTION SELECTOR WITH AUTOMATICALLY CHANGING ANNOTATIONS
Edward William Anderson, Cheltenham, England, assignor to Smiths Industries Limited, London, England
Filed Sept. 23, 1968, Ser. No. 761,485
Claims priority, application Great Britain, Sept. 25, 1967, 43632/67
Int. Cl. H01h *9/18*
U.S. Cl. 200—167 **13 Claims**



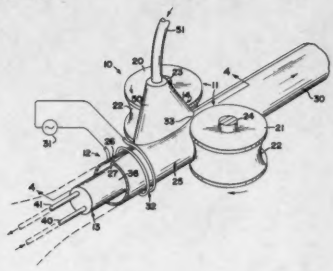
Electric switches that are each operable to perform any of a multiplicity of functions in an aircraft navigation system, are spaced along a rotatable member that is inscribed circumferentially with different sets of function-annotations applicable to the switches. Rotation of the member, by motor or hand, brings any one of the annotation-sets into view against the switches and sets circuit-selectors in accordance with the annotated-functions.

3,588,423
SEALED SWITCH ARRANGEMENT
Don M. Hallerberg, Huntington Beach, Calif., assignor to Hi Tek Corporation, Santa Ana, Calif.
Filed June 9, 1969, Ser. No. 831,294
Int. Cl. H01h *9/04*
U.S. Cl. 200—168 **5 Claims**



An improved electrical switch, such as a subminiature switch, having a diaphragm moisture and dust seal. A switch actuating button having an enlarged head projects through an opening in the switch housing. The diaphragm seal includes a toroidal or annular portion which fits into an annular groove extending in the switch housing around the button head and an integral cup shaped membrane for preventing dust and moisture from entering the switch housing from around the actuator button.

3,588,424
METHOD AND APPARATUS FOR HIGH SPEED WELDING OF STAINLESS STEEL TUBE
Herman J. Hammer, Brooklyn; Sherman T. Heald, Willoughby, and Frank A. Royce, Euclid, Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio
Filed Apr. 17, 1968, Ser. No. 721,967
Int. Cl. H05b *1/00;* **B23k** *31/06*
U.S. Cl. 219—8.5 **9 Claims**

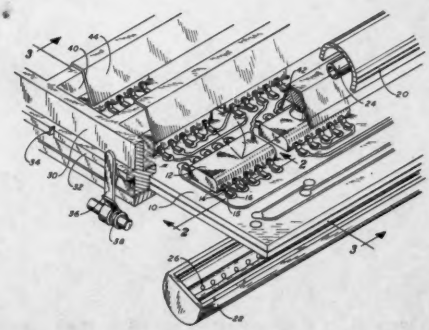


Apparatus for forming seam welded stainless steel tube including a skelp forming mill, dies for forming the skelp into a tubelike configuration defining a welding V between advancing edges of the skelp, an induction heater for producing current flow along the edges of the skelp and around the V to heat portions of the skelp defining the V, a nozzle disposed adjacent the V and effective to direct at a high velocity a mixture of inert and reducing gasses onto the V. An internally cooled impeder is disposed within the skelp adjacent the V for restricting the area of the current path to maximize the heating effect produced by a given current flow.

ERRATA

For Classes 219—056, 219—098, 219—493 see: Patent Nos. 3,588,417 thru 3,588,419

3,588,425
DUAL SOURCE RADIATION BONDING OF PLURAL JOINTS
Keith O. Erickson, White Bear Lake, Minn., assignor to Control Data Corporation, Minneapolis, Minn.
Filed July 3, 1969, Ser. No. 839,020
Int. Cl. B23k *1/04*
U.S. Cl. 219—85 **4 Claims**



A manufacturing method and apparatus for soldering the leads of integrated circuit flat packs to the contact pads of

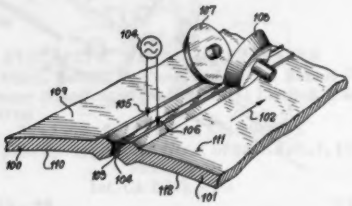
printed circuit boards. A pair of infrared lamps, focused by cylindroidal reflectors on both sides of the circuit boards are used to supply heat. Each circuit board may contain contact pads of widely varying heat sink characteristics. Addition of the second lamp as a heat source allows wide usage of the system because all possible heat requirements can be satisfied without the risks of high heat concentrations which may damage components and circuit boards.

3,588,426

METHOD AND APPARATUS FOR HI-FREQUENCY WELDING EDGES ADVANCED IN PARALLEL

Robert R. Harriau, Old Greenwich, Conn., and Wallace C. Rudd, Larchmont, N.Y., assignors to AMF Incorporated, New York, N.Y.

Filed June 27, 1969, Ser. No. 837,207
Int. Cl. B23k *31/06*
U.S. Cl. 219—67 **27 Claims**



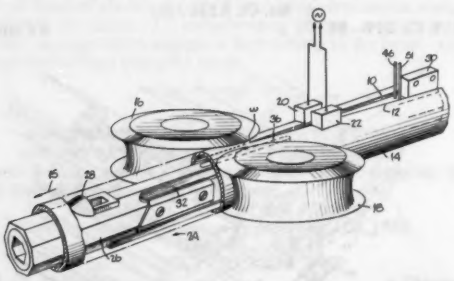
The edge of a first metal portion is welded to a surface of a second metal portion by forming at least said edge with a bulging cross-sectional shape providing a protruding volume of metal at said edge, and while advancing said edge, and said surface toward a weld point along spaced paths lying in substantially parallel planes, by heating them by high frequency electric current so that the surface and the edge are at welding temperature and at least a portion of the protruding metal is at extrusion temperature by the time the weld point is reached, at which point at least a portion of protruding metal is forced into the space between the surface and the edge to form a weld therebetween.

3,588,427

APPARATUS FOR USE IN HIGH-FREQUENCY WELDING

Edgar D. Oppenheimer, Mamaroneck, and Sidney Roberts, Flushing, N.Y., assignors to AMF Incorporated

Filed Aug. 22, 1968, Ser. No. 754,645
Int. Cl. B23k *31/06*
U.S. Cl. 219—59 **11 Claims**



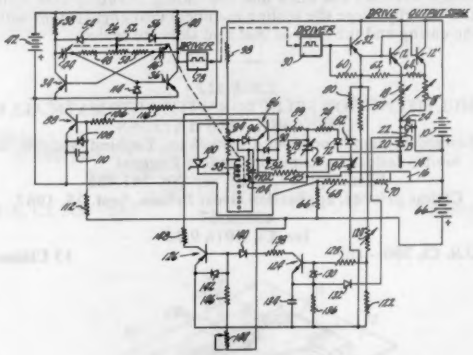
Apparatus for welding together the edges of a longitudinal gap in metal tubing in which the edges are heated to welding temperature and brought together at a weld point and a supporting mandrel is mounted inside the tubing which incorporates a scarfing tool assembly and/or an impeder assembly. This supporting mandrel has a bifurcated portion in the welding area under the weld point, resulting in a clearance space between the legs of the bifurcated portion, thereby providing a passage through which the spume emanating from the region of the weld point will pass to the advancing tube and be carried away.

3,588,428

GAP OPEN CIRCUIT PROTECTIVE SYSTEM FOR ELECTRICAL DISCHARGE MACHINING

Kurt H. Sennowitz, Royal Oak, Mich., assignor to Elox Inc., Troy, Mich.

Filed Aug. 21, 1969, Ser. No. 851,882
Int. Cl. B23b *1/08*
U.S. Cl. 219—69P **7 Claims**



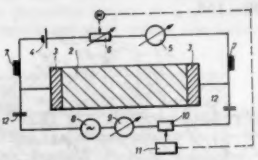
A circuit is provided to sense gap open circuit condition on initial or later downfeed of the electrode. Responsive to voltage level indicative of such condition, a portion of the drive voltage for the gap output switch is fed back, stored, amplified and applied to control the circuit pulser to narrow machining pulse on-time.

3,588,429

PROCESS AND APPARATUS FOR ELECTRICALLY HEATING AND CONTROLLING THE TEMPERATURE OF THIN LAYERS

Gunther Kampf; Bernhard Vinzelberg, Krefeld-Bockum, and Helmut Walz, Leverkusen, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 17, 1968, Ser. No. 745,636
Int. Cl. H05b *3/00*
U.S. Cl. 219—50 **5 Claims**



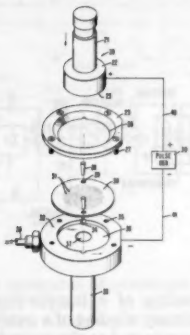
Novel heating, controlling and temperature measuring process and apparatus including means for impressing two different currents onto an electrically conductive layer on the substance in question and controlling one current as a function of the other. The two circuits may use common terminals and in any case are electrically separated from each other by conventional means.

3,588,430

FABRICATION OF COMPLEX ELECTRODES BY PHOTOETCHING FOR ELECTRICAL DISCHARGE MACHINING APPARATUS

Arthur Appel, Bronx, and Edward J. Taschler, Hopewell Junction, N.Y., assignors to International Buisness Machines Corporation, Armonk, N.Y.

Filed Jan. 13, 1967, Ser. No. 609,144
Int. Cl. B23p *1/08, 1/04*
U.S. Cl. 219—69 11 Claims



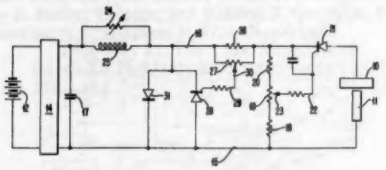
A method and apparatus are provided for accurately and inexpensively making tools to be used in EDM and in the like. Photoetching techniques are used to fabricate both a precise pattern of apertures and alignment holes in a thin metallic sheet to be used as the cathodic electrode in the EDM process used for making the tools. The photographic transparency made for photoetching may be used to fabricate many identically patterned sheets with identically located alignment holes. The thin sheet patterned electrodes, which may be readily and accurately replaced, are used in the EDM process to fabricate intricate tools which are highly precise although their fabrication requires deep erosion.

3,588,431

METHOD AND APPARATUS FOR ELECTRICAL DISCHARGE MACHINING USING A SUBSTANTIALLY CONSTANT CURRENT DENSITY DURING A SPARK DISCHARGE

Adrianus J. Pekelharing, and Hendrik E. de Bruyn, Delft, Netherlands, assignors to Cincinnati Milacron Inc.

Filed Sept. 5, 1968, Ser. No. 757,727
Int. Cl. B23p *1/08*
U.S. Cl. 219—69 12 Claims



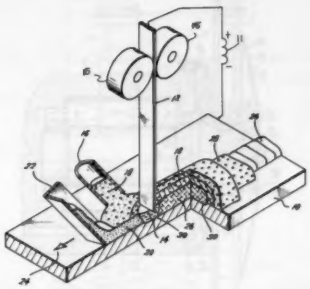
A method for maintaining a substantially constant current density during a spark discharge in electrical discharge machining whereby the wear of the tool electrode is reduced substantially. One apparatus includes an inductance and resistor in parallel whereby the resistor produces a predetermined minimum current flow between the workpiece and the tool discharge upon start of current flow therebetween, and the inductance regulates the rate of increase of current from the predetermined minimum current to maintain a substantially constant current density as the area of the discharge increases.

3,588,432

STRIP BULKWELDING

Roman F. Arnoldy, Houston, Tex., assignor to R.I. Patents, Inc., Houston, Tex.

Filed Feb. 24, 1969, Ser. No. 807,477
Int. Cl. B23k *9/18*
U.S. Cl. 219—73 5 Claims



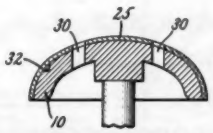
The present invention encompasses a method of welding which utilizes a consumable strip electrode having dimensions in the range of approximately 1½ inches in width and from 0.001 to 0.015 inches in thickness, and which electrode is moved parallel to the base metal that is being welded. A layer of granular alloy material is laid on the base metal in order to give a weld having a specific composition with a closely controlled analysis. To achieve an operation having a high capacity with a variety of compositions being available for the weld, the granular material is fed at a granular-to-electrode weight ratio of approximately 1 to 1 to 3 to 1.

3,588,433

ARCING CONTACT STRUCTURE AND METHOD OF MAKING SAME

Cecil Bailey, Woodlyn, and Oscar C. Frederick, Springfield, Pa., assignors to General Electric Company

Filed May 23, 1968, Ser. No. 731,466
Int. Cl. B23k *9/04, 9/00*
U.S. Cl. 219—76 5 Claims



Discloses a refractory metal arcing contact and a method for making it and for joining it to connection metal support. Refractory metal is plasma-arc sprayed onto the roughened surface of the support to form a porous, refractory metal coating interlocking with the surface. Then molten, high conductivity metal is infiltrated into the coating to fill its pores, after which the infiltrant is solidified in the pores.

3,588,434

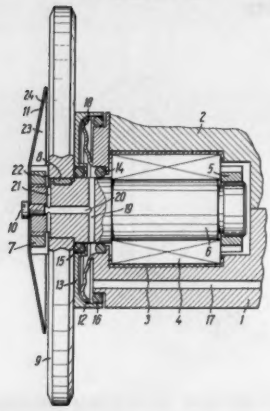
SLIDING CURRENT LEADS TO MACHINES INTENDED FOR SEAM RESISTANCE WELDING

Dashkevich, Mikhail Pavlovich, Prospekt Smirnova, 45, kv. 10, Leningrad, U.S.S.R.

Filed Aug. 2, 1967, Ser. No. 657,947
Int. Cl. B23k *11/06*
U.S. Cl. 219—84 7 Claims

A sliding current lead for machines for seam resistance welding comprises a nonrotatable sliding contact adapted for connection with a current-carrying bus bar and a working electrode fixed on a rotatable support shaft which is rotatable in bearings isolated from the body and said current-carrying bus bar. The nonrotatable sliding contact is arranged

between the current-carrying bus bar and the working electrode and is applied against the latter by means of a current-carrying resilient member which electrically connects the



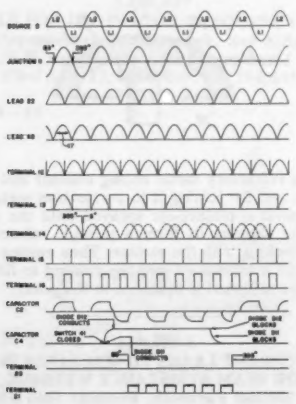
nonrotatable sliding contact and the current-carrying bus bar and urges the sliding contact against the working electrode. A cooling liquid passes through the sliding current lead and applies additional contact force on the resilient member.

3,588,435

SOLID-STATE HEAT CONTROL AND INITIATING CIRCUIT FOR A RESISTANCE WELDER CONTROL

James J. Eckl, Milwaukee, Wis., and James Thomas Griffin, Scottsdale, Ariz., assignors to Square D Company, Park Ridge, Ill.

Filed May 28, 1968, Ser. No. 732,676
Int. Cl. B23k *11/24*
U.S. Cl. 219—108 **8 Claims**



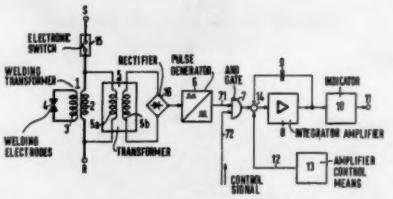
A solid-state control for a resistance welder which will prevent false tripping of a solid-state logic memory in response to bounce of the contacts of an initiating switch which initiates and terminates welding current flow and a heat control circuit that will provide equal opposite polarity half cycles of welding current flow under varying ambient temperature conditions.

3,588,436

CIRCUIT ARRANGEMENT FOR MONITORING THE WELDING CURRENT OF WELDING APPARATUS

Hans Hoscheler, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin, Germany

Filed Oct. 17, 1969, Ser. No. 867,291
Claims priority, application Germany, Oct. 19, 1968, P 18 04 106.0
Int. Cl. B23k *11/24*
U.S. Cl. 219—109 **5 Claims**



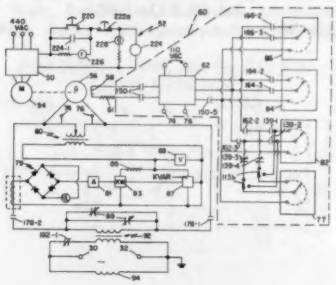
The primary winding of a transformer is connected in parallel with the primary winding of a welding transformer. A pulse generator is connected to the secondary winding of the transformer via a rectifier. The pulse generator produces a pulse of constant amplitude for such length of time as the voltage supplied to it by the rectifier exceeds a response level. An integrator amplifier is connected to the pulse generator and is switched back to its initial condition upon the completion of a supply of welding current to the welding apparatus. An indicator connected to the integrator amplifier indicates when the voltage produced by such amplifier exceeds the response level.

3,588,437

CONDUCTIVE SOLIDS WELDING CIRCUITRY

Peter Dominic Prevett, Stoneham, and Theodore Joseph Morin, Needham, Mass., assignors to Industrial Magnetics, Inc., Canton, Mass.

Filed Dec. 11, 1968, Ser. No. 782,914
Int. Cl. B23k *11/24*
U.S. Cl. 219—113 **15 Claims**

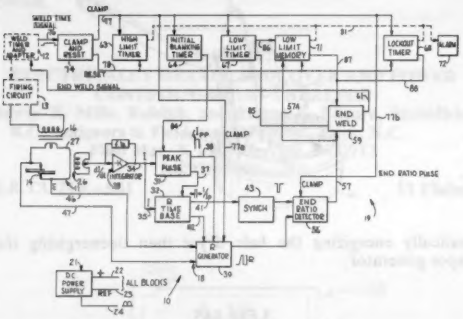


Conductive solids are worked in heating and force application cycles under the control of circuitry including, in various aspects, circuitry for varying the heating rate during the heating cycle; circuitry for initiating capacitor charging after the initiation of the heating cycle but prior to termination of the heating cycle by a time interval not substantially greater than that required for capacitor charging; and steering circuitry for selective employment of first, second, and third subcycle control circuits.

3,588,438
ELECTRICAL CIRCUIT

Peter W. Vanderhelst, Livonia, Mich., assignor to Robotron Corporation, Detroit, Mich.

Filed Aug. 26, 1968, Ser. No. 755,158
Int. Cl. B23k *11/24*
U.S. Cl. 219—117 34 Claims



A method and apparatus of resistance welding control for sensing the contact resistance at the welding position, terminating weld current within a predetermined time range and at a predetermined fraction of the value of the contact resistance if such is reached within said time range and providing alarms indicative of present weld condition and impending degradation. The contact resistance is determined by detecting the amplitude peak of the weld current waveform and thereupon charging a storage device at a rate proportional to the instantaneous electrode voltage for a relatively short interval inversely proportional to the peak weld current amplitude to produce a pulse of height proportional to the instantaneous contact resistance. Weld termination means responsive to the instantaneous contact resistance terminates the weld current when the contact resistance reaches a predetermined fraction of its peak value or at least within a selected time range. A plurality of timers cause the weld termination means to terminate weld current at the beginning of said range if the contact resistance is less than said predetermined fraction or at the end of said time range if the instantaneous contact resistance has not then reached said fractional value. Alarms are actuated to indicate questionable or doubtful present welds and impending process degradation.

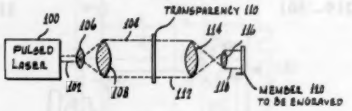
ERRATA

For Classes 219—121, 219—130, 219—137, 219—214, 219—271, 219—308, 219—378, 219—486 see: Patent Nos. 3,588,463 thru 3,588,471

3,588,439
HIGH RESOLUTION LASER ENGRAVING APPARATUS

Macy E. Heller, Trenton, and Hendrik J. Gerritsen, Princeton Junction, N.J., assignors to RCA Corporation

Filed May 12, 1967, Ser. No. 638,105
Int. Cl. G02b *27/22;* B23k *9/00;* G01d *15/10*
U.S. Cl. 219—121 12 Claims

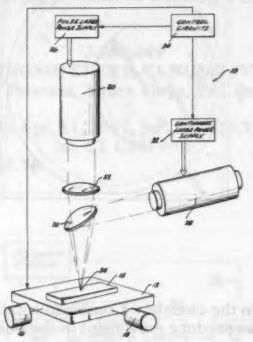


A pulsed laser illuminates an entire given area of the surface of a member to be engraved with coherent light which varies in relative intensity from point to point over its cross section in accordance with a predetermined pattern. It has been found that if the absolute intensity and time of duration of the pulse of coherent light are proper, it is possible to obtain engravings in which details of the order of 2 microns in the engraved pattern can be resolved. This makes it possible to engrave not only pictorial patterns, but also hologram patterns.

3,588,440
LASER COMBINATION ENERGY SYSTEM

James H. Morse, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed June 26, 1969, Ser. No. 836,875
Int. Cl. B23k *27/00*
U.S. Cl. 219—121 6 Claims

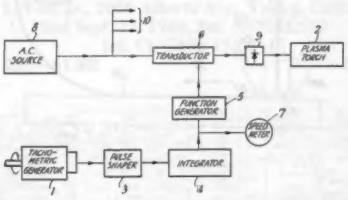


First and second lasers having different characteristics are focused on the same spot so that the different characteristics can be employed on the same spot. For example, a solid-state laser can melt a spot on a workpiece, and a fluid-state laser can maintain the liquid spot. A positioning and feeding table is preferably employed to locate the spot on the workpiece at which the combination of the lasers is active.

3,588,441
CLEANING OF RAILS

David John Miller Dobbs, and Derek Linder, London, England, assignors to British Railways Board, London, England

Filed Apr. 8, 1969, Ser. No. 814,395
Claims priority, application Great Britain, Apr. 17, 1968, 18135/68
U.S. Cl. 219—121P 5 Claims



A method and apparatus is provided for treating rails by plasma torch to improve wheel/rail adhesion. The power supplied to the torch is regulated automatically so that it is approximately proportional to the square root of the speed at which the vehicle passes along the rail.

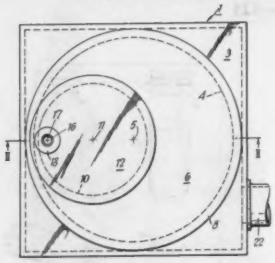
3,588,442
TOOLS WITH RESPECT TO WORKPIECES IN ENVIRONMENTAL CHAMBERS

Kenneth Walter O'Riley, Surrey, England, assignor to Vickers Limited, London, England

Filed Apr. 17, 1969, Ser. No. 817,061
Claims priority, application Great Britain, Apr. 26, 1968, 20,034/68
Int. Cl. B23k *15/00*
U.S. Cl. 219—121 11 Claims

One wall of an enclosure unit that bounds a working chamber is formed with a first aperture which is sealed over by a first cover plate rotatable about a central axis of the aperture. The first cover plate has an eccentric second aperture which is sealed over by a second cover plate rotatable

about a central axis of the second aperture, the second cover plate being apertured eccentrically to permit the sealed passage therethrough of means for operating upon a stationary workpiece in the chamber. Combined rotations of the two cover plates can produce movement of the point of operation over the workpiece in various directions parallel to the said one wall.



3,588,443

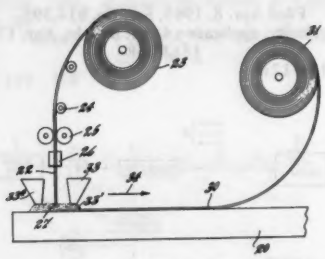
ELECTRIC ARC OVERLAY WELDING

Wallace C. Johnson, Wilmington, N.C., assignor to Arcos Corporation, Philadelphia, Pa.

Continuation-in-part of application Ser. No. 617,239, Feb. 20, 1967. This application Dec. 10, 1969, Ser. No. 883,757

Int. Cl. B23k *9/00*

U.S. Cl. 219—137 **6 Claims**



Electric arc overlay welding, often called arc cladding, on a metallic backing which in many cases will be a steel backing. A barrier strip rests on the backing and a strip electrode spaced from the backing arcs to the barrier strip. The barrier strip or the strip electrode made by powder metallurgy has a metal oxide such as iron oxide included in it which oxidizes carbon picked up from the metal backing.

3,588,444

HAIR-TREATING APPARATUS

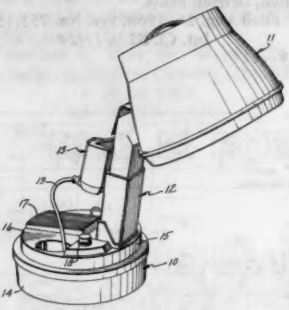
William A. Omohundro, Westport, Conn., assignor to General Electric Company

Filed Mar. 13, 1969, Ser. No. 806,966

Int. Cl. F24h *3/00*

U.S. Cl. 219—362 **6 Claims**

A hair-treating apparatus including a hair dryer, a vapor generator, and controls for regulating both. A control circuit through a thermally responsive switch provides for regulating the operation of the apparatus when the hair dryer and vapor generator are intended for combined use by energizing only the vapor generator until liquid in the vapor generator is vaporized and the thermal switch is caused to operate automatically energizing the hair dryer then deenergizing the vapor generator.



3,588,445

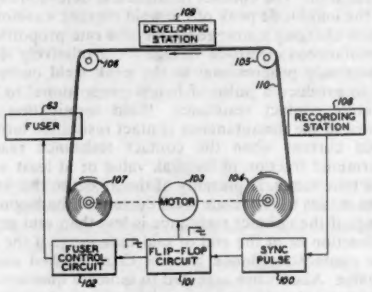
FUSER CONTROL CIRCUIT

Charles L. Hopkins, West Webster, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Jan. 17, 1969, Ser. No. 792,055

Int. Cl. H05b *1/02*

U.S. Cl. 219—501 **8 Claims**



A fuser control circuit for use in an electronic printer having apparatus to sense signals indicative of paper or recording web speed. Other apparatus responsive to the sensed signals applies power to the fuser which is proportional to the paper speed. The power applied to the fuser heater element controls the temperature of the fuser and thus, the heat applied to fix developed latent images on the travelling paper.

3,588,446

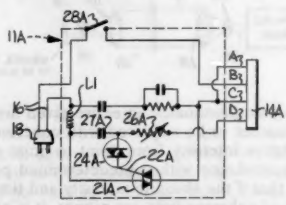
ELECTRICALLY HEATED BEDCOVER AND POWER MODULATING CONTROL CIRCUITS THEREFOR

Edwin R. Mills, Raleigh, and Ernest L. Elmore, Smithfield, N.C., assignors to Fieldcrest Mills, Inc., Eden, N.C.

Filed Mar. 3, 1969, Ser. No. 803,644

Int. Cl. H05b *1/02*

U.S. Cl. 219—501 **11 Claims**



An electrically heated bedcover such as a blanket wherein the average power delivered to a heating circuit including an

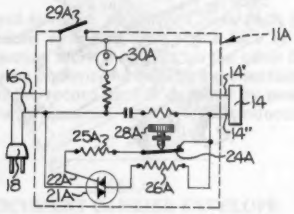
electrical heating element in the blanket is modulated in response to low current level gating signals applied to a gate control element of a semiconductor switching means by varying the conduction angle thereof, and wherein the gating signals are applied by a gating signal means including at least one positive temperature coefficient resistance device responsive to a temperature indicative of the comfort of a user of the blanket for varying the resistance of the gating circuit.

3,588,447

ELECTRICALLY HEATED BEDCOVER AND POWER CONTROL CIRCUIT THEREFOR

Edwin R. Mills, Raleigh, and Ernest L. Elmore, Smithfield, N.C., assignors to Fieldcrest Mills, Inc., Eden, N.C.

Filed Mar. 3, 1969, Ser. No. 803,913
Int. Cl. H05b *1/02*
U.S. Cl. 219—501 **11 Claims**



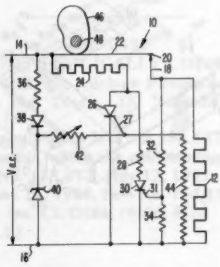
An electrically heated bedcover wherein control over power delivered to an electrical heating element in a blanket is exercised by a semiconductor, gate-controlled, switch in response to low-current level gating signals applied to a gate control element of the semiconductor switch by a gating signal circuit means. The gating signal circuit means includes a positive temperature coefficient switch for increasing the resistance of the signal circuit to a substantially infinite resistance upon exposure to a rising temperature and thereby interrupting the delivery of power through the semiconductor switch to the blanket-heating element.

3,588,448

TEMPERATURE CONTROL SYSTEM FOR GLASS-CERAMIC COOK-TOP

Garo M. Ziver, Greencastle, Pa., assignor to Corning Glass Works, Corning, N.Y.

Filed Mar. 21, 1969, Ser. No. 809,341
Int. Cl. H05b *1/02*
U.S. Cl. 219—511 **13 Claims**



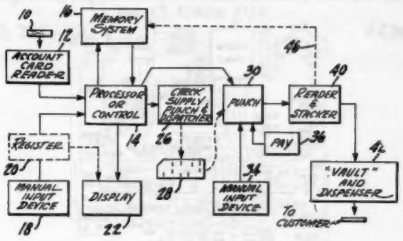
A temperature control circuit for use with a glass-ceramic cook-top. The control circuit controls the rate at which heat is generated by the cook-top and also prevents the temperature of the cook-top from exceeding a maximum temperature which could cause permanent damage to the cook-top; i.e., the circuit provides both input rate control and over-temperature control. The amount of heat delivered to the cook-top is controlled by a thermal relay which is operated by elements sensitive to the temperature of the cook-top. The control circuit consists basically of an electrical heating element, a temperature sensing element which is integrated with the heating element, a thermal relay, a solid-state switching network including at least one silicon-controlled rectifier, and a regulated voltage supply network including a Zener diode.

3,588,449

ELECTRONIC CHECK-CASHING SYSTEM

Thomas Glynn Paterson, Valley Forge, Pa., assignor to RCA Corporation

Filed Apr. 11, 1967, Ser. No. 629,958
Int. Cl. G06f *7/04*
U.S. Cl. 235—61.7B **13 Claims**



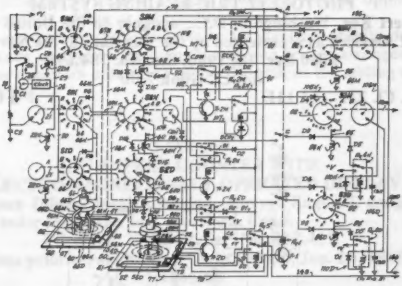
An apparatus is disclosed for dispensing currency automatically, on demand, to a customer of a bank. A memory stores a secret "Swiss" bank number for each account and is addressable upon entry of a customer's identification or account card. Manual entry of the correct Swiss bank number by the customer enables the customer to communicate with a currency dispensary unit.

3,588,450

TIME FEE COMPUTER

Mihran LeVon, Jr., 2000 Alberta Ave., Venice, Calif.

Filed Sept. 23, 1968, Ser. No. 761,589
Int. Cl. G06k *15/00*
U.S. Cl. 235—61.8R **15 Claims**



A time fee computing system, suitable for use in parking lots and the like, utilizes as primary components conventional stepping switches having typically 12 or 24 positions. The start time is encoded digitally on a ticket in terms of the rotary position of a mark for each digit. After the elapsed time to be computed, the ticket is read by scanning the mark positions for each digit, starting at the positions that represent present time. Each scanning sensor is driven by a stepping switch, which steps forward both for maintaining the sensor normally at present time and for scanning the ticket. The elapsed time is then obtained from the complements of

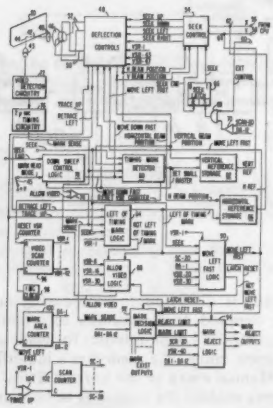
the numbers of steps required to find the respective marks. The cost or fee corresponding to the elapsed time is computed by stepping switches interconnected in a manner corresponding to the particular cost schedule in effect. The schedule is variable by changing the network, as by providing an interchangeable circuit unit for each desired fee schedule. For payment of the fee, a conventional coin receiver is controlled by stepping switches which compute and continuously indicate the fee remaining to be paid. The system includes circuitry for algebraic addition of values supplied as positions of stepping switches, and provides coding circuitry for translating such values into conventional decimal or other codes for display or output.

3,588,451

MARK READ APPARATUS USING SMALL RASTER

Paul E. Nelson, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 8, 1968, Ser. No. 743,128
Int. Cl. G06k *7/10*
U.S. Cl. 235—61.11 **11 Claims**



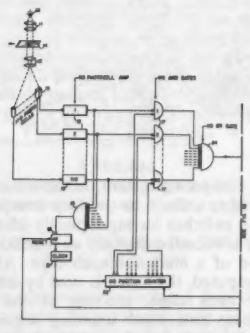
An optical system for reading marks on a document. Each mark area is scanned by a beam in a raster pattern. The number of times which a mark is encountered during the raster pattern scan of a mark area provides an indication of the existence of a mark and the strength of the existing mark. Orientation for the raster pattern scans is provided by a timing mark associated with a line of mark areas.

3,588,452

PHOTOELECTRIC READING SYSTEM

Robert Kee, Washington, D.C., assignor to the United States of America as represented by the Secretary of the Navy

Filed Dec. 18, 1968, Ser. No. 784,690
Int. Cl. G06k *7/00*
U.S. Cl. 235—61.11E **6 Claims**



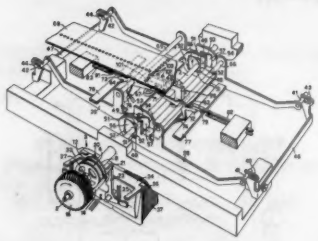
This disclosure is directed to an automatic electro-optical system designed to digitize and convert scientific data appearing on a film into a format suitable for computer operation. The system allows for sidewise slippage of the film while ensuring detection of all the information across the width of the film as the film passes by the detection means.

3,588,453

READER FOR A PUNCHED PAPER TAPE OR OTHER PUNCHED SUPPORT

Raffaele Becchi, Ivrea, Italy, assignor to Ing. C. Olivetti & Co., S.p.A., Ivrea (Torino), Italy

Filed Jan. 24, 1969, Ser. No. 793,830
Claims priority, application Italy, Jan. 29, 1968, 50315-A/68
Int. Cl. G06k *7/01*
U.S. Cl. 235—61.11 **15 Claims**



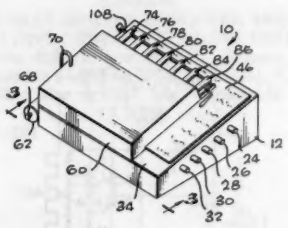
A high-speed reader for punched data wherein reading is effected by a series of code elements during advance of the punched medium, the code elements being mounted on a frame to which there is fixed an advancing shoe, the frame being movable along a closed path to permit the shoe to engage the punched support intermittently and effect the advance. The frame is provided with a window cooperating with a cam constantly in contact with a plurality of edge points of said window such that rotation of said cam causes said frame to cycle along a path substantially similar to the configuration of said window.

3,588,454

PNEUMATIC COMPUTER

Erich A. Pfeiffer, Los Angeles, Calif. (8730 Orion Ave., Sepulveda, Calif. 91343)

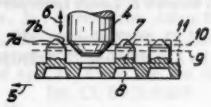
Filed Sept. 8, 1969, Ser. No. 856,094
Int. Cl. G06k *7/02*; **G06m** *1/12*
U.S. Cl. 235—61.11J **10 Claims**



Pneumatic computer having a base in which manually operable slides are movably mounted. A template plate covers the slides and has holes therein related to channels and atmospheric vents in the slides. A program card goes on top of the template plate, and a manifold block has a plurality of input and output manifolds therein, with the input and output manifolds related by interconnecting openings in the

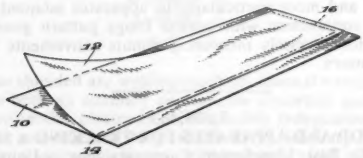
program card and template plate, and the channels and atmospheric vents in the slides. Thus, AND and OR gates are formed, with the slides furnishing input alternatives. Signalling means is connected to the output manifold to indicate logic results.

3,588,455
EMBOSSED RECORD CARD
Rudolf Ramstetter, Starnberg Am See, Germany, assignor to Polycontact AG, Chur(Graubunden), Switzerland
Filed Sept. 13, 1967, Ser. No. 667,389
Int. Cl. G06k *19/00*
U.S. Cl. 235—61.12R **8 Claims**



A record card having a plurality of rows each formed by spaced projections extending above one face of the card; with each projection there is aligned, on the other face of the card, a depression or cavity having the same sectional area as the projection; the record card is encoded by punching out the appropriate projections with a die introduced through said cavities.

3,588,456
DOCUMENT CARRIER ENVELOPE
Rex P. Mc Nabb, P.O. Box 976, Garland, Tex.
Filed Aug. 19, 1969, Ser. No. 851,252
Int. Cl. G06k *19/00*
U.S. Cl. 235—61.12 **1 Claim**



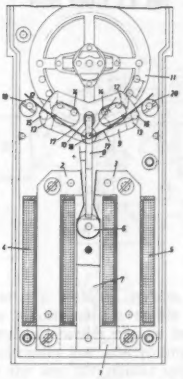
A carrier envelope for defective sheet material to enable the material to pass through data processing equipment and/or microfilming apparatus having an opaque sheet of paper and a transparent sheet secured to the face thereof along at least one end and the bottom, the envelope being from 2¾ inches to 4⅛ inches in width and 6 inches to 9 inches in length and of an overall thickness not exceeding 0.0095 inches and an uncovered band at the bottom of the front of the back sheet of at least five-eighths inches in height.

3,588,457
BEARER WITH LOGICALLY CODED DIGITS
Willem Jan Bijleveld, 10, Adriaan Pauustraat, and Adrianus Johannes Van der Toorn, 25, Norenburg, The Hague, Netherlands
Continuation of application Ser. No. 498,687, Oct. 20, 1965, now abandoned , which is a continuation-in-part of application Ser. No. 123,477, July 12, 1961. This application June 11, 1968, Ser. No. 754,159
Int. Cl. G06k *19/06, 9/10*
U.S. Cl. 235—61.12 **3 Claims**

1 2 3 4 5 6 7 8 9 0

An apparatus for reading an information bearer and an information bearer for stylized Arabic digits which are both directly visually and directly binary mechanically readable, incorporating at least one synchronizing element for the mechanical reader and a self-checking feature, and in some styles a self-correcting criterion. Five different styles of digits are disclosed, all of which are made up of congruent larger rectangular areas reserved for each digit. Each of these larger rectangular areas are divided into at least five smaller congruent rectangular areas, in which smaller areas contrasting rectangular elements are located to form the stylized readable digits. General block diagrams of the apparatus for scanning two parallel paths across each style of digit are also shown.

3,588,458
ELECTROMAGNETIC DRIVE FOR AN ADD-SUBTRACT-DECADE-COUNTER
Reinhard Jurgen Joachim Walter, and Roland Helbig, Aldingen, Germany, assignors to J. Hengstler and K. G. Zahlerfabrik, Aldingen, Germany
Filed June 3, 1968, Ser. No. 734,010
Claims priority, application Germany, June 5, 1967, H-62924
Int. Cl. G06m *3/14*
U.S. Cl. 235—92 **4 Claims**



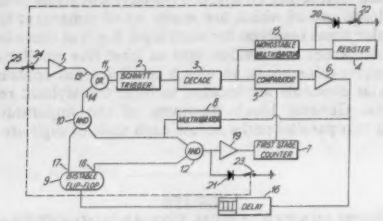
An electromagnetic drive for an add-subtract decade counter comprises an electromagnetic assembly including a pair of laterally spaced coils. An armature is pivotally mounted between the coils and is movable laterally toward whichever coil is energized. The armature pivots an escapement arranged to turn a decade counter wheel in opposite directions for adding or subtracting.

The present invention relates to an electromagnetic drive for decade counters employing a stepping device arranged to turn the counters either one of two directions for adding and subtracting.

3,588,459
HIGH SPEED COUNTER WITH ELECTROMAGNETICALLY OPERATED DISPLAY
Lawrence Dilger, South Croydon, Surrey, England, assignor to Veeder Industries Inc., Hartford, Conn.
Filed Jan. 27, 1969, Ser. No. 842,411
Claims priority, application Great Britain, Jan. 26, 1968, 4246/68
Int. Cl. G06m *3/12*
U.S. Cl. 235—92 **11 Claims**

A combined electronic and electromagnetic high speed counter wherein a decade counts least significant digits and also provides frequency divided output pulses to a register of electromagnetic counters. A single electromagnetic counter hunts on the count of the decade during high speed operation and is brought into register either at low counting speeds or when the input pulses cease. The decade is brought into register with the count stored on the single electromagnetic counter if the decade count is lost. A comparator compares the count on the decade and said single electromagnetic

counter and supplies output pulses to a logical circuit. The logical circuit includes and controls a correcting pulse



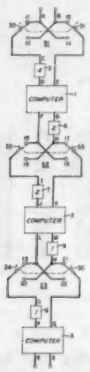
generation for correctly indexing the decade and the single electromagnetic counter.

3,588,460

FAST FOURIER TRANSFORM PROCESSOR

Richard A. Smith, Morristown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 1, 1968, Ser. No. 741,506
Int. Cl. G06f *7/38*
U.S. Cl. 235—156 **10 Claims**



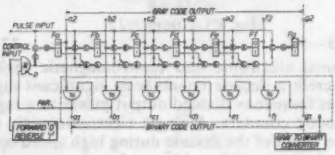
Groups of consecutive samples from two separate channels are simultaneously processed in a cascade fast Fourier transform processor by appropriately connecting selected switches and delays to the computers of the processor.

3,588,461

COUNTER FOR ELECTRICAL PULSES

James Richard Halsall, Reading, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Dec. 30, 1968, Ser. No. 787,722
Claims priority, application Great Britain, Jan. 10, 1968, 1439/68
Int. Cl. H03k *13/256*; **G06f** *5/02*
U.S. Cl. 235—92GD **7 Claims**



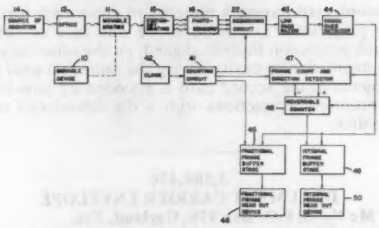
This invention relates to a counter for counting electric pulses for use in digital computers and instrumentation systems. The pulse counter of the invention comprises a plurality of bistable elements arranged to produce an output in Gray code and suitably connected to a plurality of Exclusive - OR elements for converting the Gray code output to a binary code output, means for generating a parity signal from the binary code output and means for applying the parity signal to the plurality of bistable elements. The pulse counter of the invention may be constructed so that there is no overflow in either direction or may alternatively be constructed to permit overflow and, consequently, continuous counting.

3,588,462

FRINGE INTERPOLATOR AND COUNTER

Kurt H. Kreckel, Webster, and Kallis H. Mannik, Rochester, N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed Dec. 23, 1966, Ser. No. 604,235
Int. Cl. G01b *11/04*; **G06g** *7/00*; **H03k** *13/00*
U.S. Cl. 235—92 **19 Claims**



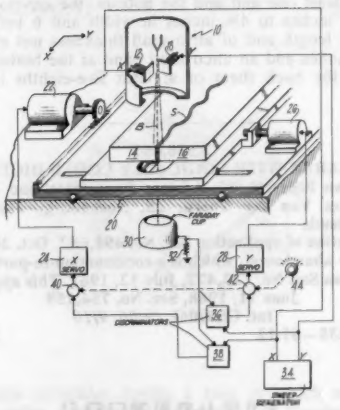
Apparatus for determining the extent and direction of movement of a movable member relative to a stationary member and more particularly to apparatus adapted to be used in conjunction with optical fringe pattern generating devices for precisely measuring minute movements in the fringe pattern.

3,588,463

METHOD AND APPARATUS FOR TRACKING A SEAM

Stanley G. Best, Manchester, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Sept. 8, 1969, Ser. No. 855,870
Int. Cl. B23k *15/00*
U.S. Cl. 219—121EB **7 Claims**



Apparatus and methods are disclosed which permit a weld seam between two workpieces to be automatically tracked. Provisions are included for tracking at a substantially con-

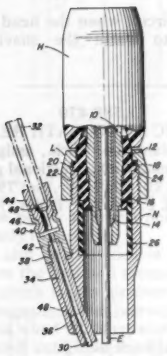
stant linear speed in the direction of the seam regardless of the direction of the seam in the pieces. An electron beam is swept in a closed path about a desired workpoint and the intersection of the path and the seam is used to determine the directional character of the seam. The beam and the workpieces are then moved relative to one another in the direction defined by the intersections. By sweeping the beam across the seam at a position displaced from the workpoint, information concerning the direction of the seam can be employed to control the movement of the workpieces with respect to the tracking beam or a welding beam at substantially constant speeds.

3,588,464

DUAL ELECTRODE TORCH FOR MANUAL WELDING

John F. Saenger, Jr., Springfield; Allan Enis, Scotch Plains, and Harry C. McGinty, Bellville, N.J., assignors to Union Carbide Corporation, New York, N.Y.

Filed Apr. 17, 1969, Ser. No. 816,998
Int. Cl. B23k 9/00
U.S. Cl. 219—130 7 Claims



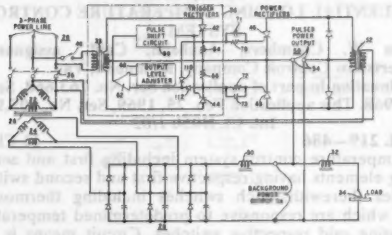
A gas shielded arc welding torch for manual welding which houses both an auxiliary consumable electrode and a main nonconsumable electrode each operable independent of one another and wherein the position of the auxiliary electrode may be selectively adjusted with respect to the main electrode. The auxiliary electrode is carried by the gas nozzle which is rotatable about its longitudinal axis and which transmits power to the auxiliary electrode. The cooling fluid for the main electrode housing is recirculated to cool the nozzle and power line for the auxiliary electrode.

3,588,465

LINE VOLTAGE COMPENSATING PULSED POWER WELDING SUPPLY

Emmett R. Anderson, Berkeley, and Robert E. Rutz, Drinda, Calif., assignors to Air Reduction Company, Incorporated, New York, N.Y.

Filed Oct. 29, 1968, Ser. No. 771,512
Int. Cl. B23k 9/00
U.S. Cl. 219—137 3 Claims



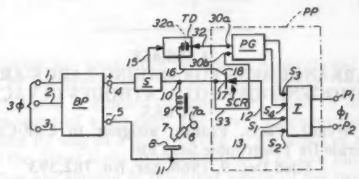
The pulsed power welding process is improved by using shorter arc lengths, which bring a need for holding the arc voltage substantially constant. To do this, line voltage compensation is required. It is accomplished in a pulsed power welding supply by a feedback loop which controls the portion of the cycle during which current is passed through a trigger rectifier, which trigger rectifier is not coupled to the load circuit. The trigger rectifier controls the passage of power through a heavy duty, power-type rectifier which is energized during periods of welding. The feedback loop is allowed to reach a steady state before power is first applied to the power rectifier, with the result that transients in the power rectifier load are avoided. In the loop, a comparison is made between a manually controllable reference wave and a sample wave derived from the output of the trigger rectifier. Line voltage variations are compensated by changes in the length of the portion of the cycle during which the trigger rectifier is conducting.

3,588,466

PULSED POWER WELDING SYSTEM WITH SUPPRESSED PULSE START

Evans H. Daggett, Murray Hill, N.J., assignor to Air Reduction Company Incorporated, New York, N.Y.

Filed Jan. 16, 1969, Ser. No. 791,669
Int. Cl. B23k 9/00
U.S. Cl. 219—137 16 Claims



A pulsed power arc welding system having background power means for maintaining a stable arc combined with complementary pulsing power means including silicon controlled rectifier circuitry for controlling flow of individual current pulses to the arc for pulsed spray arc welding, the pulsing power being excessive for initial arc starting on short circuit, a sensor for detecting background starting current, and time-delay means responsive to the sensor for applying only after predetermined delay triggering bias in one or more stages to the rectifier circuitry for starting the pulsing current.

3,588,467

UNIT FOR HEATING AND DISPENSING AEROSOL PRODUCTS

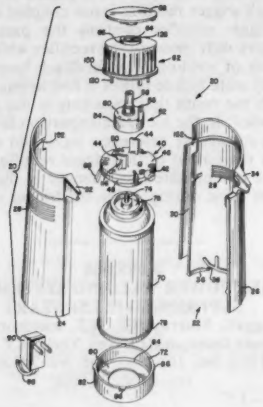
Warren J. Grosjean, Trumbull, Conn., assignor to Eversharp, Inc., Milford, Conn.

Filed Aug. 21, 1968, Ser. No. 754,177
Int. Cl. B67d 5/62; H05b 3/00
U.S. Cl. 219—214 6 Claims

A dispenser unit for heating and dispensing an aerosol product, comprising an exterior shell member having an opening in one end for receiving an aerosol container, and a combination product heater and dispenser including an improved nozzle, at the other end of the shell. The heater and dispenser includes a relatively massive heat exchanger having a product inlet, a product outlet, and a circuitous passage connecting the two, and is heated by heating element means of variable resistance. The heat transfer between the variable resistance heating means and the exchanger is facilitated by surrounding the heating element with an electrically insulating, heat conductive material, preferably a filled silicone grease, which is in intimate heat exchange contact with the exchanger. The product dispensed from the container is a flowable, foamable product, which includes a gaseous foaming agent therein.

The container is preferably a two-compartment container comprising an outer portion which includes a propellant having a liquid-vapor equilibrium at ambient temperatures, and a

flexible, inner portion for the foamable product, so the product may be dispensed at a constant overpressure and

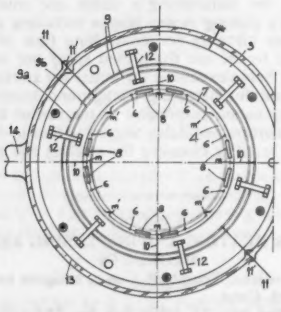


with a constant concentration of volatile foaming agent therein.

3,588,468
ARRANGEMENT FOR MAKING LARGE-AREA HOMOGENEOUS PHOTOCATHODES IN VACUUM TUBES

Georg Wendt, Paris, France, assignor to CSF-Compagnie Generale De Telegraphie Sans Fils

Filed Dec. 9, 1968, Ser. No. 782,393
Claims priority, application France, Dec. 20, 1967, 132,992
Int. Cl. F22b *1/28*
U.S. Cl. 219—271 **5 Claims**



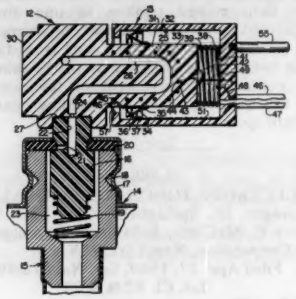
An arrangement for forming by vaporization photocathodes, in vacuum tubes, comprising an entirely symmetrical electrical circuit for heating beads of photocathode forming substance so that all these beads receive the same amount of heat and are uniformly vaporized.

3,588,469
SAFETY HEATER FOR PRODUCT DISPENSED FROM AEROSOL CONTAINER

Alan Dillarstone, Highland Park, N.J. ((c/o Colgate-Palmolive Co., 300 Park Ave., New York, N.Y. 10022))

Filed Nov. 24, 1967, Ser. No. 685,550
Int. Cl. B67d *5/62*
U.S. Cl. 219—308 **6 Claims**

A safety heater assembly for warming shaving cream being dispensed under pressure from an aerosol type container comprising a head adapted to be mounted on the depressible hollow discharge valve stem of the container and having an internal through passage surrounded by an electrical heater coil, and a contact making and breaking plug component movably mounted on the head adapted to close the circuit to the coil when connected to an electrical outlet and to auto-

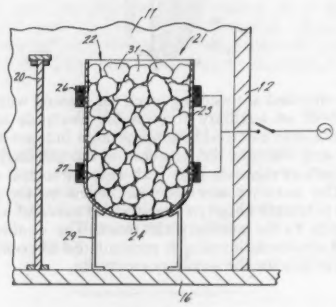


matically open that circuit when the head passage walls are sufficiently heated to warm the shaving cream being dispensed.

3,588,470
ELECTRIC SAUNA BATH HEATER

Max R. Husband, Kalamazoo, Mich., assignor to Patrick H. McCauley, Kalamazoo, Mich., fractional part interest

Filed Jan. 10, 1969, Ser. No. 790,402
Int. Cl. F24h *7/00;* **H05b** *1/00*
U.S. Cl. 219—378 **1 Claim**



An improved electrical resistance-type heating source for use in a sauna bath is comprised of an upright, open-top, closed-bottom, hollow container having imperforate walls, which container has electrical resistance heating bands affixed to the exterior surface thereof and which container is substantially filled with solid, nonporous rocks.

3,588,471
SEQUENTIAL LOADING TEMPERATURE CONTROL SYSTEM

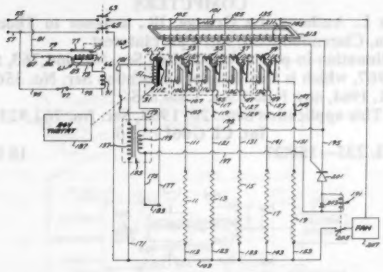
William W. Chambers, Anaheim, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Continuation-in-part of application Ser. No. 763,668, Sept. 30, 1968. This application Feb. 25, 1969, Ser. No. 805,988
Int. Cl. H05b *1/02*
U.S. Cl. 219—486 **11 Claims**

A temperature control system including first and second heating elements having respective first and second switches in series therewith, such switches including thermostatic blades which are responsive to predetermined temperatures for closing said respective switches. Circuit means is provided for sequentially heating the first and second thermostatic blades to sequentially energize said first and second heating elements whereby when power is applied to said

system the first thermostatic blade will be heated to, after a selected time, close the first switch thereby energizing the first heat element. The second thermostatic blade will then be heated to close the second switch and energize the second heating element.

The system may also include a time delay relay for delaying heating of the first thermostatic blade for a selected period of time after power has been applied to the system whereby individual temperature control systems within a community may be energized at different times to avoid



simultaneous start-up of all control systems within the community when power has been applied thereto thus preventing overloading of the power source when, for example, power has been temporarily interrupted.

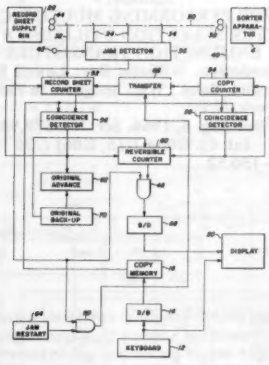
A pickup may also be provided in inductive relationship with the leads from the first and second heating elements for energizing a fan which forces air over such elements whenever current is flowing in either one of the leads whereby the fan will be started when the first element is energized and will remain operative until both the first and second switches are opened.

3,588,472

LOGIC CONTROL APPARATUS

Thomas H. Glaster, and Thomas W. Hess, Rochester, N.Y., assignors to Xerox Corporation, Rochester, N.Y.

Filed Nov. 18, 1966, Ser. No. 595,388
Int. Cl. B411 *39/02*
U.S. Cl. 235—92 **11 Claims**



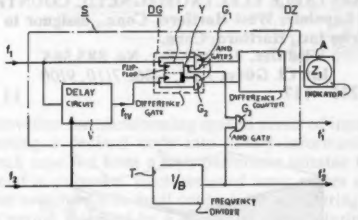
A system wherein the number of record sheets entering the transport path of a reproducing apparatus are monitored along with the number of copies egressing from the transport path. These respective numbers are compared with the number of copies desired and this comparison is utilized to provide a net count in a counter to indicate the number of original documents from which the requisite number of copies have been made, completed, and delivered to a sorting area.

3,588,473

ARRANGEMENT FOR FORMING THE QUOTIENT OF TWO FREQUENCIES

Dietrich Meyer, Hamburg, Germany, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Feb. 5, 1968, Ser. No. 702,904
Int. Cl. G06f *7/39*
U.S. Cl. 235—92 **8 Claims**



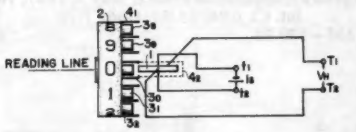
In a circuit for producing an output proportional to the quotient of the frequencies of two input signals, the lower frequency signal is applied directly to an input of one gate and to an input of a flip-flop. The lower frequency signal is also applied by way of a delay circuit to the input of another gate and the other input of the flip-flop. The two outputs of the flip-flop are applied to the other inputs of the two gates, and the outputs of the gates are applied to a difference counter. The delay circuit provides a delay related to the higher frequency signal. The circuit may be provided with outputs for permitting cascade connections in order to obtain additional integers of the quotient.

3,588,474

READOUT COUNTERS

Tsunemoto Nakanishi, Tokyo, Japan, assignor to Tamura Electric Works Limited, Tokyo, Japan

Filed Oct. 17, 1968, Ser. No. 768,459
Claims priority, application Japan, Oct. 23, 1967, 42/67815
Int. Cl. G06m *1/274*
U.S. Cl. 235—92 **6 Claims**



A readout counter is comprised by a digit wheel having a plurality of magnets corresponding to digits to be displayed and a Hall element excited by a constant current. The magnets have different intensity so that the Hall element provide an output voltage corresponding to the digits.

3,588,475

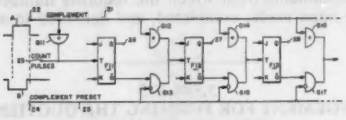
FORWARD-BACKWARD DIGITAL COUNTER CIRCUIT

John E. Scott, Rego Park, N.Y., assignor to the United States of America as represented by the Secretary of the Navy

Filed Mar. 21, 1969, Ser. No. 809,339
Int. Cl. H03k *21/16, 21/06*
U.S. Cl. 235—92EV **2 Claims**

A simplified reversible digital counting circuit having components of a J–K flip-flop, an OR gate, and an inhibit gate for

each bit or stage of the counter with an input of pulses to be counted and selective inputs of complementary signals and



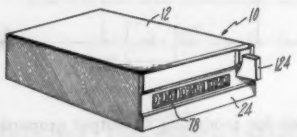
complementary-preset signals to provide forward and backward count of the count pulses on the input.

3,588,476

RESETTABLE ELECTROMAGNETIC COUNTER

Lloyd J. Lapointe, West Hartford, Conn., assignor to Veeder Industries Inc., Hartford, Conn.

Filed Dec. 9, 1969, Ser. No. 883,565
Int. Cl. G06m *1/00*; G06c *7/10, 9/00*
U.S. Cl. 235—117 **11 Claims**



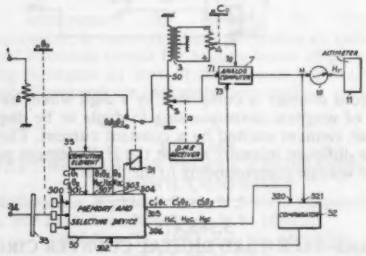
A resettable counter is provided with a plurality of stationary shafts including a number wheel shaft and reset finger shaft mounting a plurality of relatively stationary sheetlike partitioning members in fixed substantially parallel spaced relationship for separating the number wheels and reset fingers into individual compartmentalized units, and a retractable pinion shaft for moving the transfer pinions into and out of engagement with the number wheels during the resetting operation. A reset plunger retracts the pinion shaft and drives the reset fingers in unison for resetting the number wheels. The plunger and reset fingers are drivingly connected by a drive spring which permits conditioning of the reset fingers for resetting prior to retraction of the transfer pinions and snap-action resetting upon retraction of the pinions.

3,588,477

ACTUAL SLOPE COMPUTER

Rene Lami, and Georges Colombet, Paris, France, assignors to CSF-Compagnie Generale De Telegraphie Sans Fils

Filed Apr. 30, 1968, Ser. No. 725,311
Claims priority, application France, May 3, 1967, 105.164
Int. Cl. G06f *15/50*; G06g *7/70*
U.S. Cl. 235—150.22 **4 Claims**



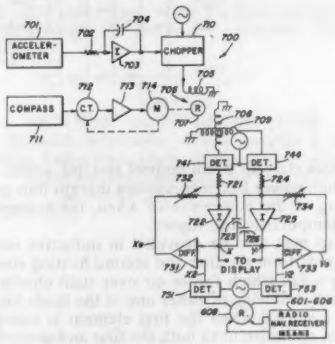
An actual slope computing system for indicating, at any moment, on board an aircraft, the deviation between the actual flight path of the aircraft and a preselected nonhorizontal nonlinear path including a first linear preselected path and a last linear preselected path, said system comprising a computing unit for computing at any moment the value of the altitude H necessary for said aircraft to follow a nonhorizontal linear path, as a function of given parameters of said first path; and a memory and logic circuits for feeding to said computing unit, at moments determined as a function of the position of said aircraft, successively the parameters of said first path, of successive programmed linear portions of said preselected path, and of said last path, said programmed linear portions being programmed for insuring a progressive merger of this first path said last path.

3,588,478

DEAD RECKONING NAVIGATION POSITION COMPUTERS

Myron L. Anthony, La Grange, Ill., assignor to Thomas E. Dorn, Clarendon Hills, Ill., a part interest

Continuation-in-part of application Ser. No. 666,763, Sept. 11, 1967, which is a division of application Ser. No. 356,462, Apr. 1, 1964, now Patent No. 3,344,665.
This application Sept. 26, 1968, Ser. No. 762,923
Int. Cl. G06f *15/50*
U.S. Cl. 235—150.27 **18 Claims**



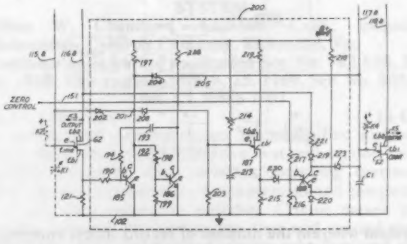
Inertial navigation systems in which basic position data is supplied to a position display device from a dead reckoning computer that resolves the outputs of speed and heading detection apparatus into coordinate position signals. Mechanical and electrical integrator systems are utilized as the basic dead reckoning computers. In the preferred constructions, the dead reckoning computer is continuously up-dated, in accordance with the output from a radio navigation receiver means, to correct the operation of the computer at a rate commensurate with the maximum overall drift rate of the sensing devices and the computer.

3,588,479

CIRCUIT FOR PERFORMING MULTIPLICATION BY CHARACTER SELECTION UTILIZING A PAIR OF UNIJUNCTION TRANSISTORS

Robert M. Henderson, Williams Bay; Lowell E. Miller, and Richard Zechlin, Beloit, Wis., assignors to Fairbanks Morse Inc., New York, N.Y.

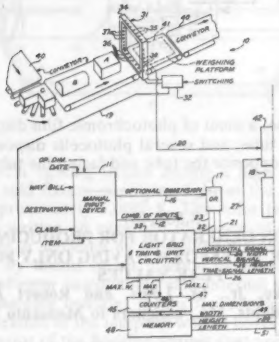
Filed Aug. 8, 1966, Ser. No. 570,987
Int. Cl. G06g *7/16*; G06j *1/00*
U.S. Cl. 235—150.52 **9 Claims**



A circuit for performing multiplication is disclosed wherein

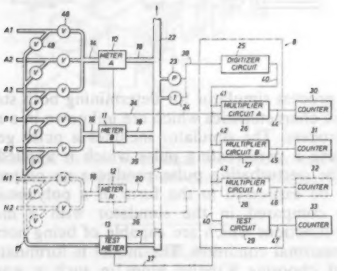
circuitry is provided for controlling the multiplication of the numerical data in preselected groupings.

3,588,480
PROCESSING CONTROL SYSTEM
Peter I. Unger, and Edward D. Bright, New York, N.Y., assignors to Fairbanks Morse Inc., New York, N.Y.
Division of Ser. No. 431,930, Feb. 11, 1965, Pat. No. 3,436,968
Filed Dec. 6, 1968, Ser. No. 841,637
Int. Cl. G01n 9/02; G01g 1/12, 23/26
U.S. Cl. 235—151.3 5 Claims



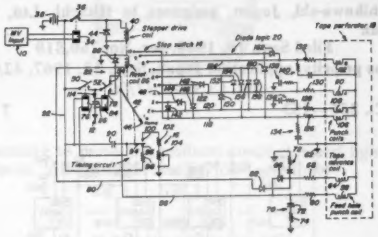
A system is disclosed for determining the volume of a moving article including sensing means arranged to receive energy beams from beam providing means. The article will interrupt certain ones of the beams and a determination of the number of beams interrupted gives an indication of the volume of the article.

3,588,481
DIGITAL MULTIPLYING CIRCUIT
Larry J. Stroman, Houston, Tex., assignor to Daniel Industries, Inc., Houston, Tex.
Filed May 1, 1969, Ser. No. 820,872
Int. Cl. G01f
U.S. Cl. 235—151.34 12 Claims



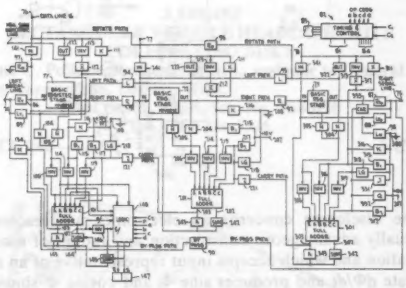
This application discloses a digital multiplying circuit for use in correcting actual fluid volume measurements to a standard volume by receiving an analog signal representative of at least one of the parameters of pressure and temperature, digitizing the analog signal, multiplying the digitized signal representative of the measured parameters by a digital signal representative of the actual measured volume of fluid, and counting the digital pulse product for obtaining standard measure of the fluid volume.

3,588,482
DECIMAL TO BINARY CONVERTER
Roger C. Glidden, Wenham, Mass., assignor to The Glidden Electric Corporation
Filed May 6, 1968, Ser. No. 726,783
Int. Cl. H04l 3/00
U.S. Cl. 235—155 12 Claims



A converter for transforming spaced series of input pulses representing a decimal code into binary information on a multitrack tape fed from a tape perforator suitable for computer read in purposes. Each series of input pulses advances a stepper switch to a decimal contact position during a timed read in period followed by a recording period during which one or more punch devices are operated by a recording pulse transmitted through diode logic from the stepper switch contact at which the switch wiper stopped during the preceding read in period. A tape advancing pulse of longer duration than the recording pulse also initiated at the beginning of the recording period in order to operate the tape advancing mechanism of the tape perforator after recording is completed. Signal conversion is completed with reset of the stepper switch terminating the tape advance pulse after which the tape is advanced by a predetermined amount.

3,588,483
VARIABLE DIGITAL PROCESSOR INCLUDING A REGISTER FOR SHIFTING AND ROTATING BITS IN EITHER DIRECTION
Robert J. Lesniewski, Greenbelt, Md.
Filed Mar. 14, 1968, Ser. No. 713,188
Int. Cl. G06f 7/50
U.S. Cl. 235—175 77 Claims



Disclosed is a data processor including a plurality of cascaded registers connected together to selectively perform left and right shifts, as well as right rotation. The register stages are selectively connected to feed and be responsive to a single data line at either end thereof. The register stages are selectively connected with parallel data lines to be responsive to signals on the data lines. Words stored in the register can be combined with words on the parallel data lines in accordance with logical functions such as AND, OR, EXCLUSIVE OR, ADDITION, and SUBTRACTION. The register

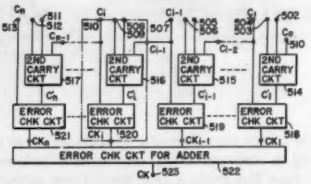
stages can also combine signals from one of the serial data lines with signals stored therein and from the parallel data lines.

3,588,484

ERROR DETECTING SYSTEM OF ADDER

Tetsunori Nishimoto, Kokubunji-shi; Kisaburo Nakazawa; Koichiro Ishihara, Kodaira-shi, and Hisashi Horikoshi, Tachikawa-shi, Japan, assignors to Hitachi, Ltd, Tokyo, Japan

Filed Sept. 18, 1968, Ser. No. 760,510
Claims priority, application Japan, Sept. 18, 1967, 42/59444
Int. Cl. G06f *11/00*
U.S. Cl. 235—153 **7 Claims**



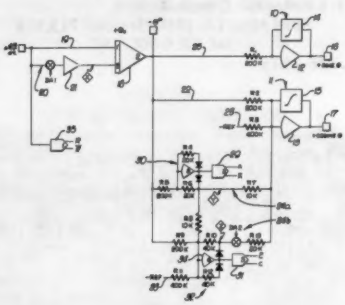
A carry of the lower figure of two adjacent numerical figures of an adder is fed to a second carry circuit with an augend and an addend of the upper figure and a second carry is produced thereby. The second carry is compared to a first carry of the upper figure derived from a carry look ahead circuit with the result that an error check signal is generated when first and second carries do not agree with each other.

3,588,485

RATE RESOLVER WHICH ACCEPTS AN ANGULAR RATE INPUT AND PRODUCES A SINUSOIDAL OUTPUT

Gilbert R. Grado, 17611 Orange Tree Lane, Tustin, Calif.

Filed Feb. 20, 1969, Ser. No. 800,874
Int. Cl. G06g *7/22*
U.S. Cl. 235—186 **5 Claims**



The disclosure concerns an electronic rate resolver of unusually advantageous construction and foolproof mode of operation and which accepts input representative of an angular rate $d\Phi/dt$ and produces sine Φ and cosine Φ sinusoidal output.

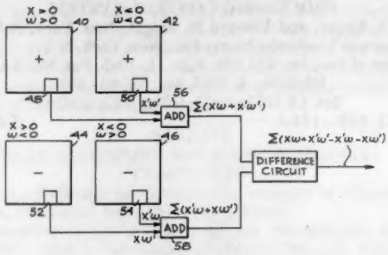
3,588,486

MATRIX MULTIPLIER FOR OBTAINING THE DOT PRODUCT OF TWO VECTORS

Charles A. Rosen, Atherton, Calif., assignor to Stanford Research Institute, Menlo Park, Calif.

Filed Sept. 16, 1966, Ser. No. 580,083
Int. Cl. G06g *7/16*
U.S. Cl. 235—194 **9 Claims**

A matrix multiplier for use in learning machines in which the dot product of two vectors may be readily obtained and where at least one vector may contain numerous components. The apparatus of the invention comprises a



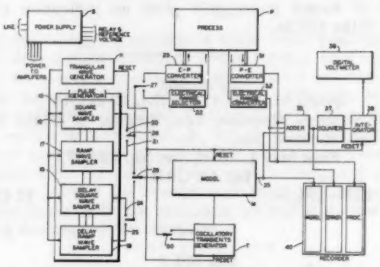
cathode-ray tube, a sheet of photochromic film disposed over the face of the tube, and several photocells disposed on the side of the film opposite the tube and facing the tube face.

3,588,487

FUNCTION GENERATOR FOR PRODUCING A TRIANGULAR WAVEFORM HAVING ONLY POSITIVE PEAK VALUES

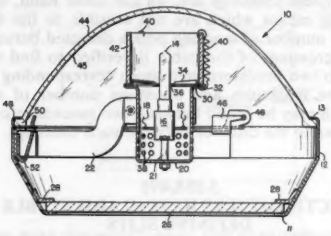
Louis H. Fricke, Jr., St. Louis, and Robert A. Walsh, Richmond Heights, Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 495,565, Oct. 13, 1965, Pat. No. 3,505,512
Filed Aug. 25, 1969, Ser. No. 870,811
Int. Cl. G06g *7/26, 7/18*
U.S. Cl. 235—197 **10 Claims**



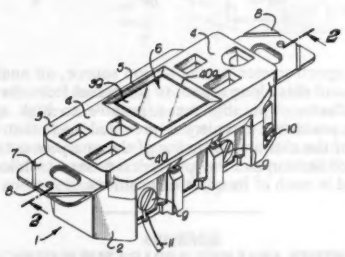
A rapid process simulator for determining both static and the dynamic characteristics which are unknown in a relatively stable process. The simulator includes a pulse generator for producing a perturbating pulse which is applied to the process. The perturbating pulse produces an output signal which can be expressed in the form of a polynomial. The process is compared in the simulator with a model of orthogonal functions which are capable of being normalized to an orthonormal condition. The model is formulated with the idea of choosing a pulse input in such a way as to facilitate the construction of the system. An output signal is also produced in the model which is in turn compared with the output signal from the process in order to achieve an error signal. This signal is squared in the simulator and integrated to determine the characteristics of the system. The simulator includes a transport delay device for delaying the perturbating pulse to the model with respect to the process, so that the output of the process and the model will begin in coincident times. In addition, the simulator is provided with a generator to produce oscillatory transients on a model of the signal to match transient on the process signal.

3,588,488
HIGH KELVIN SURGICAL LIGHTING FIXTURE
Norman E. Lauterbach, Pittsford, N.Y., assignor to Sybron Corporation, Rochester, N.Y.
Filed June 16, 1969, Ser. No. 833,375
Int. Cl. A61g 13/00
U.S. Cl. 240—1.4 6 Claims



A surgical lighting fixture having a high kelvin rating is disclosed, said fixture supplying light at the color temperature of approximately 6,000° K. The color temperature thus attained is written an accepted tolerance of perfect average daylight and is achieved by raising the illumination source of 3,000° K. by means of an internal cylindrical filter and a dichroic reflector surrounding said internal filter. The lamp housing assembly contains means for cooling the lamp seal during operation of the lamps as well as cover means for sealing the interior of the housing against dust and to prevent unwanted heat from passing to the front of the surgical fixture to the patient and the doctors below.

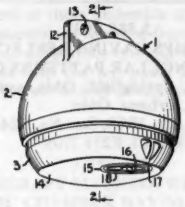
3,588,489
ILLUMINATED ELECTRICAL DEVICE
Jack H. Gaines, Seal Beach, Calif., assignor to Sierra Electric, Inc., Gardena, Calif.
Filed Apr. 4, 1968, Ser. No. 718,782
Int. Cl. F21v 33/00
U.S. Cl. 240—2 9 Claims



An electrical device with dual receptacles and an exposed electroluminescent panel between the receptacles for illumination.

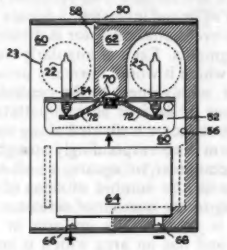
3,588,490
LAMP DEVICE
Thomas H. Nicholl, 1204 W. 27th St., Kansas City, Mo.
Filed Dec. 4, 1968, Ser. No. 781,221
Int. Cl. F21v 33/00
U.S. Cl. 240—6.4 8 Claims

A self-contained lamp device having a hollow body substantially in the shape of a spherical segment having a flattened base and a platform removably mounted within the hollow body. A pair of batteries are mounted in the platform and engage a plurality of contacts mounted in said platform for energizing an electric light bulb mounted in a resilient conductor extending outwardly from one of said contacts. The body has a resilient portion which is deformable inwardly to engage and operate bulb-energizing means which



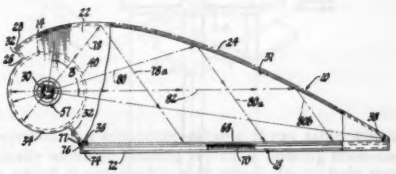
are operative to move the resilient conductor and light bulb between an "off" position and an "on" position.

3,588,491
ILLUMINATION UNIT
Charles Franc, 1501 First Ave., New York, N.Y.
Division of Ser. No. 671,330, Sept. 28, 1967, Pat. No. 3,522,426
Filed Oct. 7, 1969, Ser. No. 864,467
Int. Cl. F21v 33/00; G09f 13/00
U.S. Cl. 240—6.4 5 Claims



A disposable power source adapted to be detachably secured to a support such as a greeting card with an area or section through which light can shine or be directed, said source including a lamp for producing the light and a self-contained battery for the lamp.

3,588,492
RECTANGULAR VEHICLE HEADLAMP WITH COLLIMATING DISCS
Samuel C. Pollock, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Oct. 1, 1968, Ser. No. 764,076
Int. Cl. F21v 7/06
U.S. Cl. 240—41.1 1 Claim



A motor vehicle headlamp including a housing having a reflecting surface which is a segment of a parabolic cylinder wherein a linear light source is located along the focal axis of the parabolic cylinder and the light emitted therefrom is laterally controlled by a laminae of optical discs that columnize the light such that the rays are directed onto the reflecting surface in planes substantially normal to the focal axis.

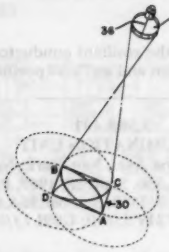
The reflected light rays are forwardly distributed in a desired illumination pattern by an optical lens located in a rectangular frontal opening of the housing.

3,588,493

PROJECTING LAMPS HAVING REFLECTOR WHICH FORM RECTANGULAR PATTERNS OF LIGHT

Robert G. Nordquist, Springfield, Ohio, assignor to Grimes Manufacturing Co., Urbana, Ohio

Filed Apr. 29, 1968, Ser. No. 724,688
Int. Cl. F21v 7/09
U.S. Cl. 240—41.37 **12 Claims**



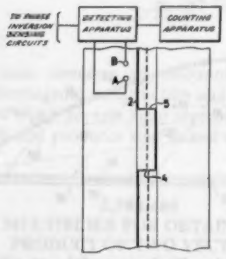
Projecting lamps are formed with reflectors which define, beyond the region of image inversion, a square or rectangular light pattern. A conventional reflector is divided into four arcuate separate segments. Each is angularly outwardly offset from the position which it would normally occupy in the conventional reflector, with respect to the central axis, resulting in the displacement of radiant energy patterns in superimposition. Since the reflector is divided along straight lines the image portions form a correspondingly straight line pattern, which may be rectangular or square, at all regions beyond image inversion, with the number of sides of the pattern of light corresponding to the number of reflector segments. The resulting pattern is substantially uniform in intensity from corner to corner and has an area which is smaller than the area formed by the conventional reflector by a factor of pi.

3,588,494

PROCESS AND APPARATUS FOR MEASURING THE DISTANCE TRAVELLED BY A REMOTE CONTROLLED VEHICLE

Pierre Mertens, Uccle, Belgium, assignor to Ateliers De Constructions Electriques De Charleroi (ACEC), Societe Anonyme, Charleroi, Belgium

Filed Feb. 19, 1969, Ser. No. 800,542
Claims priority, application Belgium, Feb. 21, 1968, 54,832
Int. Cl. B61l 21/00
U.S. Cl. 324—63 **8 Claims**



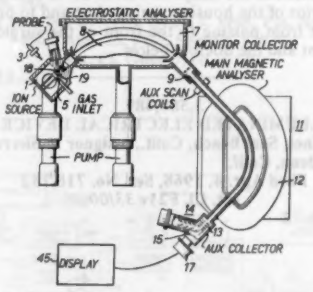
The disclosure relates to a process and an apparatus for measuring the distance travelled by a remote controlled vehicle. The apparatus includes a loop consisting of a cable placed along the path of the vehicle and having equidistant crossings in such a way as to invert, at these crossings, the phase of the signals fed to the cable, and means for detecting and counting these phase inversions to provide an indication of the distance travelled by the vehicle. It is further characterized by the fact that the cable is given, at different locations, a configuration producing, in the transmission to the vehicle, signals which are different from those produced by the crossings and forming marking points of a different type. The said signals are detected aboard the vehicle by a detecting apparatus which is not sensible to the regular crossings of the cable. These crossings are, on the other hand, detected by detecting means which are not sensible to the marking points. The number of marking points detected between two successive crossings of the cable is verified to find out if it lies between two predetermined limits corresponding respectively to the maximum and minimum number of marking points which may be found between two successive crossings depending on to the distance between such crossings.

3,588,495

MASS SPECTROMETERS HAVING ADJUSTABLE BEAM DEFINING SLITS

John Stephen Halliday, Sale; Thomas Oliver Merren, Mawdesley, and John Stewart Heath, Sale, England, assignors to Associated Electrical Industries, Limited, London, England

Continuation of application Ser. No. 557,272, June 13, 1966, now abandoned. This application May 22, 1969, Ser. No. 827,076
Claims priority, application Great Britain, June 11, 1965, 24770/65
Int. Cl. H01j 39/34
U.S. Cl. 250—41.9 **10 Claims**



A mass spectrometer having an ion source, an analyzer, a collector, and slits along a path of ion travel from the source to the collector. The slits are adjustable to high and low resolution positions. Circuitry is provided such that the adjustment of the slits and scanning of the analyzer occurs in a coordinated fashion and the analyzer is scanned while a slit is maintained in each of its adjusted positions.

3,588,496

RADIATION ANALYSIS APPARATUS HAVING AN ABSORPTION CHAMBER WITH PARTIALLY REFLECTIVE MIRROR SURFACES

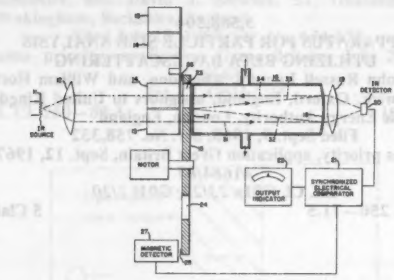
Lawrence R. Snowman, Pennellville, N.Y., assignor to General Electric Company

Filed Dec. 26, 1968, Ser. No. 786,996
Int. Cl. G01n 21/26
U.S. Cl. 250—43.5 **8 Claims**

A radiation absorption analysis apparatus is disclosed for identifying samples of gases, aerosols, and liquids which exhibit characteristic absorptances. The apparatus takes the form of an optical comparator with means for introducing into an absorption chamber in succession two adjacent parallel beams of dissimilar spectral content. At both extremities of the absorption chamber partially transmissive mirrors are arranged to sustain multiple internal reflections for the entrant radiation and thereby increase the absorptive path length. The beams exiting from the chamber are then measured in succession and compared for sample analysis.

The beam formation means, a partially reflective plane mirror at the entrant surface of the absorption chamber, and

a partially reflective concave mirror at the exit surface of the absorption chamber, are coaxially arranged in a confocal



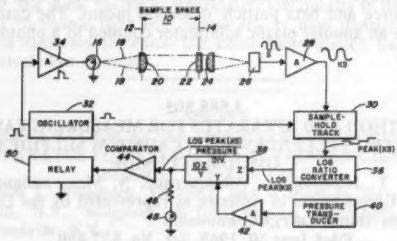
system to minimize vignetting as well as to reduce sensitivity to stray dirt on the lens surfaces or to asymmetric zoning.

3,588,497

APPARATUS FOR MEASURING THE CONCENTRATION OF GUN GAS AND FOR DEACTIVATING A GUN AT DANGEROUS GAS LEVELS

Robert J. Jordan, Lexington Park, Md., assignor to the United States of America as represented by the Secretary of the Navy

Filed June 13, 1969, Ser. No. 833,034
Int. Cl. G01n *21/26*
U.S. Cl. 250—43.5R **8 Claims**



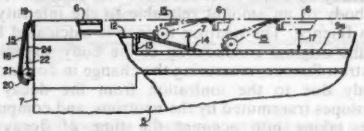
A device for measuring the explosive content of gas in a gun bay. A beam of modulated light is projected across the compartment to shine on a bolometer which measures the infrared absorption by the gas in the compartment. When the lower explosive limit of the gas is approached an alarm sounds and a relay deactivates the gun.

3,588,498

X-RAY TABLE TOP HAVING A SAFETY SHIELD FOR A PATIENT 'S TOES AND FINGERS

Robert L. Guenthner, Catonsville, Md., assignor to Westinghouse Electric Company, Pittsburgh, Pa.

Filed June 19, 1969, Ser. No. 834,711
Int. Cl. G03b *41/16*
U.S. Cl. 250—54 **3 Claims**



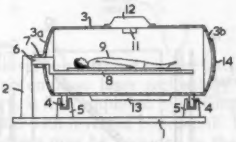
Described is an improvement in an X-ray table which has a patient supporting top panel assemblage having ends movable longitudinally past raised subsurfaces potentially obstructive to patient's fingers or toes which may extend downwardly from such top panel ends. Vertically sloping ramps are provided such raised subsurfaces and a pair of shields and rollers at their underside are hinged to ends of such top panel assemblage to move from normally suspended repose positions to subsurface-contour-following positions in general alignment with the top panel assemblage when the respective ends thereof moves inwardly of the end of the table.

3,588,499

RADIATION THERAPY MACHINE WITH A ROTATABLE HYPESBARIC CHAMBER HAVING A RADIATION SOURCE MOUNTED THEREIN

James W. Pegrum, Carp, Ontario, Canada, assignor to Atomic Energy of Canada Limited, Ottawa, Ontario, Canada

Filed June 3, 1968, Ser. No. 733,904
Claims priority, application Canada, June 15, 1967, 993,082
Int. Cl. H01j *5/48*
U.S. Cl. 250—55 **4 Claims**



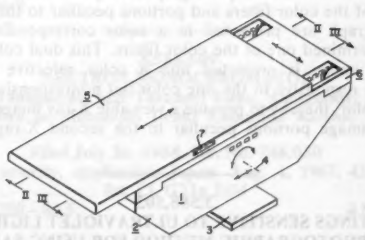
Radiation therapy apparatus includes a patient support within an angularly-movable tank and a housing containing a radiation source carried by the tank such that radiation from the source is directed towards the patient support. The tank housing and source are angularly adjustable relative to the patient support, and the interior of the tank can be pressurized to a pressure above normal atmospheric pressure.

3,588,500

X-RAY TABLE WITH SELECTIVE FLOAT AND POWER DRIVE TOP

Harry E. Koerner, Catonsville, Md., assignor to Westinghouse Electric Corporation, Pittsburg, Pa.

Filed Nov. 22, 1968, Ser. No. 778,107
Int. Cl. G01n *23/04*
U.S. Cl. 250—55 **7 Claims**



Described is a motorized tiltable X-ray table with a longitudinally movable floating top on a floating cross-carriage frame which is engageable with power drive chain means in the frame via a lever-operated mechanism in the top. The top is coupled longitudinally to a multiturn cable drum in the frame via a cable loop. A brake on the drum provides longitudinal float position locking of the top. Control means for the table prevents tilting of the table while the top is floating longitudinally, and, in tilted table attitudes, prevents disengagement of the top from the drive chain means, permits longitudinal powerdrive of the table top and transverse floating movement of the cross-carriage frame.

3,588,501
THERMOGRAPHIC PROCESS FOR THE MANUFACTURE OF PROJECTION TRANSPARENCIES AND MATERIALS THEREFORE

Robert Dean Lowrey, and William A. Huffman, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

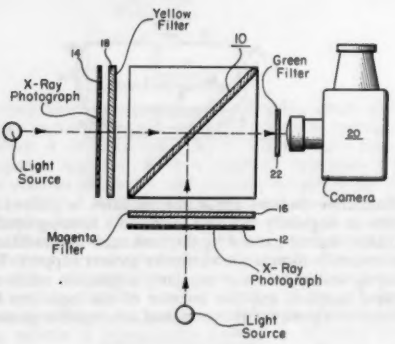
Filed May 21, 1969, Ser. No. 826,691
Int. Cl. G03b *41/00*
U.S. Cl. 250—65T 3 Claims

A source sheet coated with a particulate volatilizable solid in a polymeric binder yields a succession of projection transparencies on a single reusable transparent heat-resistant film receptor sheet in a thermographic image transfer process.

3,588,502
RADIOGRAPHIC IMAGE SUBTRACTION TECHNIQUE

George B. Greenfield, 4855 Greenleaf Ave., Lincolnwood, Ill.

Filed Mar. 3, 1970, Ser. No. 16,191
Int. Cl. G03b *41/16*
U.S. Cl. 250—65R 5 Claims



An X-ray image subtraction technique useful in angiography or the like involves producing first and second X-ray photographs of a preselected anatomical subject area, the second photograph being made subsequent to injecting an appropriate X-ray contrast media into the arteries, etc. that have been selected for study. The resultant X-ray photographs are then projected through different color filters to provide a composite X-ray image wherein common portions of the first and second photographs are presented in the sum color of the color filters and portions peculiar to the second photograph are presented in a color corresponding to a predetermined one of the color filters. This dual color composite image is projected into a color selective viewing system responsive to the one color but nonresponsive to the sum color, thereby to provide a viewable X-ray image of only those image portions peculiar to the second X-ray photograph.

3,588,503
COATINGS SENSITIVE TO ULTRAVIOLET LIGHT AND PHOTOGRAPHIC METHOD FOR USING SAID COATINGS

Harold C. Brill, Wilmington, Del., assignor to E. I. du Pont De Nemours and Company, Wilmington, Del.

Filed Mar. 28, 1969, Ser. No. 811,652
Int. Cl. G03b *41/00*; C08g *51/04*
U.S. Cl. 250—65 13 Claims

A composition which darkens on exposure to shortwave invisible light and returns to its original brightness on subsequent removal of the effective radiation is prepared by mixing a hydroxylated titanium or niobium compound in finely divided form with an aldehyde, preferably polymeric in nature, such as urea-formaldehyde or phenol-formaldehyde. The corresponding niobium compounds may be substituted in part or whole for the titanium compounds.

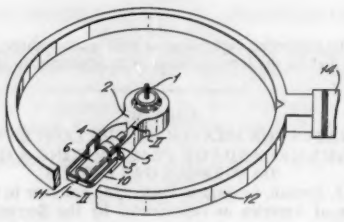
ERRATUM

For Class 250—065 see:
Patent No. 3,588,030

3,588,504
APPARATUS FOR PARTICLE SIZE ANALYSIS UTILIZING BETA BACKSCATTERING

Brian John Russell Laundy, Abingdon, and William Horton Hardwick, Oxford, England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Sept. 9, 1968, Ser. No. 758,332
Claims priority, application Great Britain, Sept. 12, 1967, 41664/67
Int. Cl. G01n *23/22*; G01t *1/20*
U.S. Cl. 250—71.5 5 Claims

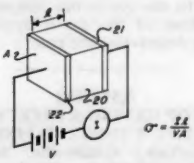


Particle size analysis apparatus is provided for fitting into a centrifuge. It comprises a sedimentation tube, a beta particle source and beta particle detection means. The detector can be an annular plastic scintillator coupled to a photomultiplier.

3,588,505
METHOD AND APPARATUS FOR MEASURING FAST NEUTRON FLUENCES WITH CADMIUM SULFIDE OR CADMIUM SELENIDE

Ralph T. Johnson, Jr., Albuquerque, N. Mex., assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed June 30, 1969, Ser. No. 837,460
Int. Cl. G01t *3/00*
U.S. Cl. 250—83.1 5 Claims

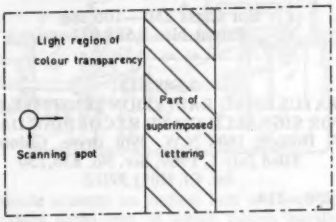


Apparatus and method for measuring neutron influences including a body of material having elements therein which are transmitted by irradiating neutrons into radioisotopes which decay by emission of radiation and produce ionization in the body of an amount relatable to the intensity of the neutron fluence. The neutron fluence is calculated by measuring the original conductivity of the body, exposing it to the neutron fluence, measuring the change in conductivity of the body due to the ionization from the decay of the radioisotopes transmuted by the neutrons, and computing the fluence, taking into account the time of decay of the radioisotopes; or, alternatively, after exposure to the neutron fluence detecting each ionization event, determining the event rate, and computing the fluence, taking into account the time of decay of the radioisotopes.

3,588,506
PHOTOELECTRIC SCANNING AND IMAGE-MODIFYING EQUIPMENT

Derek J. Kyte, 177, Valley Road, Chorleywood, Hertfordshire, and David J. Stewart, 52, Oakland Drive, Wokingham, Berkshire, England

Filed July 18, 1967, Ser. No. 654,172
Claims priority, application Great Britain, July 20, 1966, 32664/66
Int. Cl. G01t 1/16
U.S. Cl. 250—83.3 10 Claims

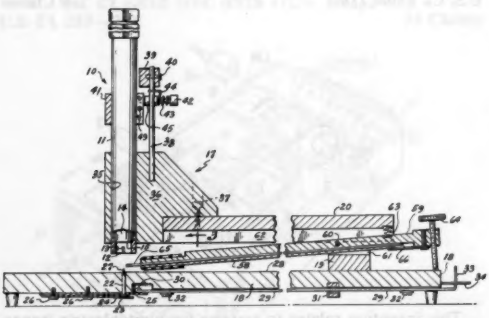


Electro-optical image reproducing equipment in which electrical signals produced by photoelectric scanning of an original, after modification in tone or color correcting circuits, are used to control the brightness of a light beam, said light beam being responsible for the exposure of a light sensitive layer to produce an image representative of some tonal or color function of the original, for example, to the production of an image from a plurality of originals. There is a simultaneous photoelectric scanning of a color or monochrome transparency together with a superimposed mask, the mask having comparatively low density in its image areas to visible light but comparatively high density to infrared radiation to which the color transparency has comparatively low densities.

3,588,507
BETA BACKSCATTER THICKNESS MEASURING APPARATUS FOR APERTURES IN PRINTED CIRCUIT BOARDS AND THE LIKE

Jacques J. Weinstock, Flushing, and William D. Hay, Peekskill, N.Y., assignors to Unit Process Assemblies, Inc., Woodside, N.Y.

Continuation-in-part of application Ser. No. 642,630, May 9, 1967, now abandoned. This application Apr. 1, 1968, Ser. No. 723,646
Int. Cl. G01t 1/16
U.S. Cl. 250—83.3 22 Claims

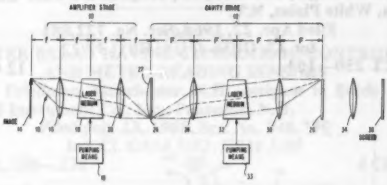


Apparatus for locating a beta ray emitting probe assembly and an aperture in a printed circuit board or other workpiece at a measuring station in precise relationship to one another to effect beta backscatter-type measurements of the thicknesses of platings on a predetermined area on the sidewall of a selected aperture, including means for guiding the probe assembly for movement between a retracted position and an advanced operative measuring position to assure directed impingement of a collimated beam of beta radiation on said predetermined area of the wall of any aperture selected from a plurality of similar apertures in a board.

3,588,508
LASER INFRARED IMAGE CONVERTER

Harold Wieder, Cupertino, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 30, 1968, Ser. No. 763,890
Int. Cl. H01s 3/00
U.S. Cl. 250—83.3 14 Claims

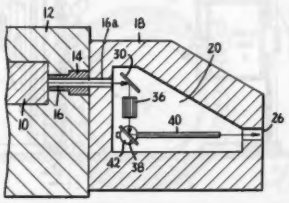


A device for converting infrared images into visible images is described which employs laser technology. The infrared image, if necessary, is first amplified by passing it through an active laser medium with inverted population. Image forming lenses and field lenses may be provided in the amplification stage to preserve the image. If the infrared image has sufficient power, amplification may not be required. The image is then transmitted into a multimode degenerate laser cavity. The laser cavity consists of an active medium disposed between two end mirrors. The laser cavity is of the type having an upper level which is a common level for laser transitions to two lower levels, one transition occurring in the infrared range and one in the visible range. The two end mirrors of the cavity are highly reflective for the visible mode and highly transmissive for the infrared mode so that the laser operates in the visible mode. The active medium in the laser cavity is thresholded such that when the infrared image is transmitted into the cavity, the light path modes carrying the infrared light will be depopulated and will "turn off" where the infrared image is most intense. Those light modes where the infrared image is not present will continue to lase most intensely in the visible and a complement or negative of the infrared image will be produced, with the result that a visible image can be coupled out of the cavity which has visible light in those regions where the infrared of the image was not present.

3,588,509
NEUTRON MONOCHROMATOR

Kazuo Yanagishita, and Takanori Kano, Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed July 26, 1968, Ser. No. 748,050
Claims priority, application Japan, Aug. 4, 1967, 42/50141
Int. Cl. G21g 3/04
U.S. Cl. 250—84.5 4 Claims



A beam of neutrons passes through an entrance hole bored in a stationary shield block and is reflected by a rotata-

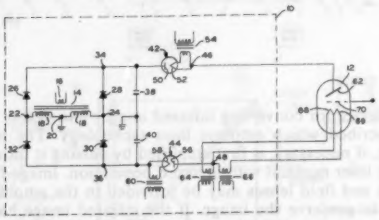
ble crystal to form a beam of monochromatic neutrons. After having been defined by a collimator, the beam of monochromatic neutrons is reflected by another crystal which is movably disposed in the shield block through an exit hole in the shield block. In order to selectively extract beams of monochromatic neutrons which are different in neutron wavelength, the first crystal is rotatably mounted and the second crystal is also rotatably mounted as well as being mounted for translational movement toward and away from the exit hole along a guide rail.

3,588,510

X-RAY TUBE PROTECTIVE CIRCUIT INCLUDING THERMIONIC DISCHARGE MEANS CONNECTED IN SERIES WITH THE X-RAY TUBE

Robert M. Gager, Elmhurst, Ill., assignor to Picker Corporation, White Plains, N.Y.

Filed Apr. 22, 1968, Ser. No. 722,881
Int. Cl. G03b *41/16*; H01j *37/22*
U.S. Cl. 250—103 **12 Claims**



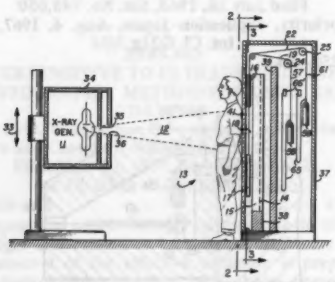
A power supply circuit for operating an X-ray tube includes a DC constant potential source provided with storage capacitor means for discharging current through the X-ray tube when the X-ray tube is switched into operation. A pair of thermionic diodes are connected in series between each principal electrode of the X-ray tube and the aforementioned capacitor means. The level of emission in each thermionic diode is limited to couple substantially normal current to the X-ray tube when the X-ray tube is switched into operation, without the occurrence of an excessive voltage drop across the diode. However, the level of emission is limited so that a substantially increased voltage drop takes place across each diode in the event of spurious discharge or short circuit in the tube such that current substantially in excess of the normal current tends to be drawn.

3,588,511

SHUTTER ARRANGEMENT FOR RADIOGRAPHY

James R. Montagne, 327 San Jose Ave., Apt. 1, Los Gatos, Calif.

Filed May 31, 1968, Ser. No. 733,521
Int. Cl. G03b *41/16*
U.S. Cl. 250—105 **3 Claims**



Radiographs are made by exposures of x-rays upon a photographic surface wherein x-ray impervious shutters are independently positionable to provide an aperture for exposing a desired area of the photographic surface, and for blocking radiation to other areas. Electrical contacts are provided on the shutters which will close an electrical circuit to cut the power of drive motors when either shutter reaches the limit of its travel, or when the two shutters close together. The shutters are mechanically supported by electrically insulated cables which further provide a connecting circuit between electrical contacts on the shutters and the motor control system.

ERRATUM

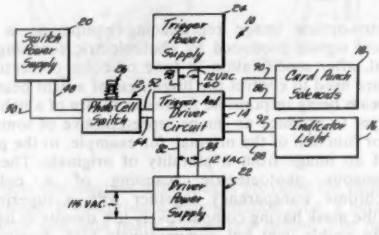
For Class 250—106 see:
Patent No. 3,588,031

3,588,512

APPARATUS USING RADIATION SENSITIVE SWITCH FOR SIGNALLING AND RECORDING DATA

Harry F. Hollien, 1000 N.W. 39th Drive, Gainesville, Fla.

Filed July 1, 1969, Ser. No. 838,130
Int. Cl. H01j *39/12*
U.S. Cl. 250—214 **1 Claim**



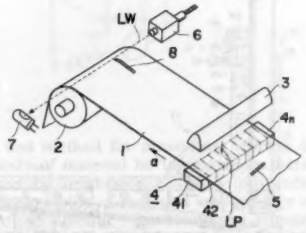
An underwater data signalling and recording system which includes an underwater switch in the form of a light source, a photocell, and means for occluding the light source. A modified Schmitt trigger circuit is responsive to the switch to fire an SCR which drives indicating and recording means.

3,588,513

METHOD AND APPARATUS FOR PHOTOELECTRIC INSPECTION OF SHEET MATERIALS

Hiroo Akamatsu, Takatsuki, and Takanobu Morita, Otokunigun, Japan, assignors to Omron Tateisi Electronics Co., Ukyo-ku, Kyoto, Japan

Filed Apr. 8, 1969, Ser. No. 814,309
Claims priority, application Japan, Apr. 8, 1968, 43/28109
Int. Cl. G01n *21/32*
U.S. Cl. 250—219 **9 Claims**



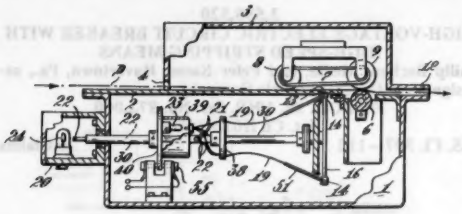
This invention relates to systems for photoelectric inspection of sheet materials wherein defects such as wrinkles, protuberances and sticking substances lying lengthwise on sheets can be infallibly detected by shooting a narrow beam of light widthwise, sheerly close to and across the surface of the moving sheet material, and simultaneously, photoelectrically detecting any influence on the said light beam, such as interception or reflection, by defects on the sheet material.

3,588,514

GRAPHIC SCANNING APPARATUS WITH FLEXIBLE OPTICAL FIBRES

Frederick W. Simpkins, Hanover, Mass., assignor to Alden Research Foundation, Westboro, Mass.

Filed Sept. 11, 1969, Ser. No. 857,149
Int. Cl. G02b 5/16; H04n 3/06
U.S. Cl. 250—227 23 Claims



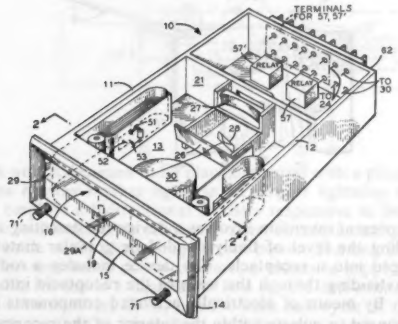
In a facsimile scanner an endless belt is driven by wheels on two straight paths one of which passes parallel to an original document, or an image thereof, fed at right angles to the path of the belt. A hollow shaft is coupled to the belt to rotate at the same r.p.m. One end of a flexible optical pickup fiber is held on the belt viewing the document. The other fiber end is carried axially in the hollow shaft and directed at a phototube. As movement of the belt causes the first fiber end to scan the document along one straight line path, the fiber intermediate its ends flexes as the distance between the two ends of the fiber varies. Additional fibers adjacent the pickup fiber conduct light to the document from a lamp rotating with the hollow shaft, illuminating the area of the document to be scanned by the pickup fiber. By color filtering two or more adjacent pickup fibers a color document is scanned and electrical color signals generated sequentially by one phototube or simultaneously by several phototubes. Alternatively several fibers scan a transverse zone of the document simultaneously intersecting characters thereon and energizing a plurality of photocells for electrical recognition of successive characters. Light from a lamp modulated by a facsimile signal source may be carried by fibers into photosensitive paper scanned by the moving ends of the fibers to record the facsimile signals on the paper.

3,588,515

INSTRUMENT WITH INDICATING AND RELAY MODES OF OPERATION COMPRISING AN ELECTRICAL CONDUCTOR CARRIED BY A FLEXIBLE FILM

Joseph Barbas, Jr., Newark; Justin V. Paulauskas, Elizabeth, N.J., and William C. Peterson, Brooklyn, N.Y., assignors to Weston Instruments Division, Newark, N.J.

Filed Aug. 13, 1969, Ser. No. 849,664
Int. Cl. G01d 5/34; H01h 47/24; H01j 39/12
U.S. Cl. 250—231 15 Claims



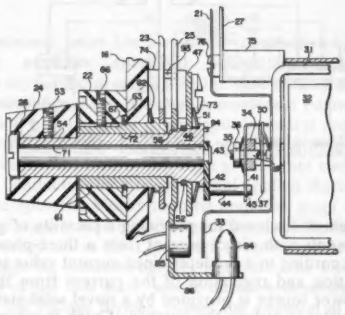
An instrument having indicating and relay modes of operation, employs an optical system that produces a beam of light for providing an indication on a display screen representative of an input signal parameter and, additionally controls the operation of a relay by electrical signals produced by photoactivation and deactivation of a photodetector. An elongated flexible film having two ends mounts the photodetector adjacent one end thereof. The one film end is movable along and adjacent one screen surface and the electrical signals produced by the detector are transmitted to the relay through an electrical circuit. The circuit includes a plurality of elongated flexible conductive strips mounted on the film and having one end connected to the detector and movable in unison therewith and the other end fixed. This arrangement permits the film to form a loop which facilitates smooth movement thereof along the one screen surface and permits electrical leads from the relay to be readily connected to the fixed ends of the strips in noninterfering relationship with the film.

3,588,516

METER RELAY HAVING CONCENTRIC CONTROLS AND METER-READING SENSORS

Joel S. Friedman, Manchester, N.H., assignor to Beede Electrical Instrument Co., Inc., Penacook, N.H.

Filed July 23, 1968, Ser. No. 746,790
Int. Cl. G01d 5/32; G01r 5/00
U.S. Cl. 250—231 4 Claims



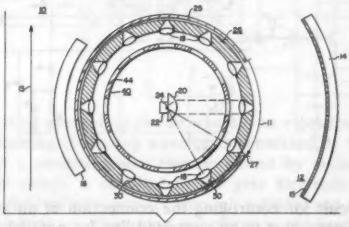
A control meter relay having one or more set points, the set point controls extending concentrically from the front of the meter coaxial with the axis of rotation of the meter movement, allowing control of the set points from one location on the front of the instrument. Another feature is that the zero adjustment means of the meter movement may also be concentric with the set point controls.

3,588,517

OPTICAL SCANNING SYSTEM HAVING A DETECTOR DISPOSED AT THE CENTER OF CURVATURE OF A SPHERICAL FOCAL SURFACE

Richard F. Maxwell, Jr., Fort Lauderdale, Fla., and Francis J. Kaisler, Ellicott City, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 23, 1968, Ser. No. 707,717
Int. Cl. G01d 5/36, 5/40
U.S. Cl. 250—233 10 Claims



This invention relates to an optical scanner system including a lens system for focusing a radiation image onto a spher-

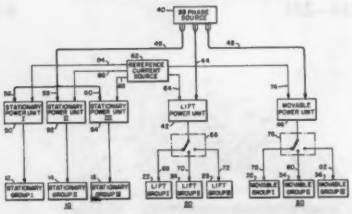
ical focal surface, a radiation detector disposed at the center of curvature of the spherical focal surface, a first rotatable drumlike member disposed between the detector and the focal surface and including a plurality of lenses for collimating a portion of the radiation directed on the focal surface onto the radiation detector, a second rotatable member including a plurality of slits for selectively allowing the radiation derived from one of the plurality of lenses of the first rotatable member to be directed onto the radiation detector, and a motor associated with the first and second rotatable members for driving the first and second members at slightly different speeds in order that the slits of the second member may be successively aligned with different lenses of the first rotatable member.

3,588,518

POWER MULTIPLEXING SYSTEM

Andre Wavre, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 13, 1969, Ser. No. 798,911
Int. Cl. H02j *3/14*
U.S. Cl. 307—38 **12 Claims**



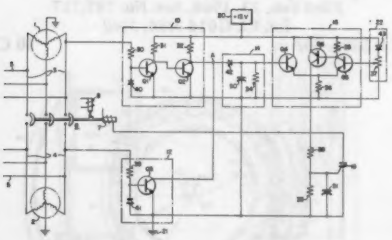
A system is disclosed for providing a plurality of groups of load elements with direct current from a three-phase power source according to a predetermined current value sequence. Rectification and regulation of the current from the three-phase power source is provided by a novel solid-state power unit. In order to reduce the number of such rectifying power units, controlled switching devices are utilized for multiplexing the outputs from the rectifying power units such that more than one group of load elements is energized by a single power unit. Alarm protection means provides an alarm signal in the event that more than one such group of load elements is energized at any given time from a given power unit.

3,588,519

AUTOMATIC PARALLELING SYSTEM

Richard E. Luebrecht, Wapakoneta, Ohio, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 21, 1969, Ser. No. 851,972
Int. Cl. H02j *3/00*
U.S. Cl. 307—87 **4 Claims**



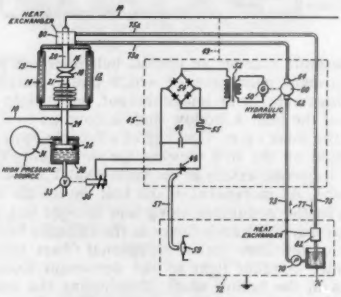
A circuit for controlling the connection of an alternating current generator to an energized line for parallel operation with another generator is provided with transistor switching circuit means responsive to the voltage waveforms of the generator and of the line to produce a combined waveform with the duration at the maximum of the combined waveform being directly proportional to the phase difference, during which a capacitor is charged whose discharge signal is one input to a differential amplifier. The other input of the differential amplifier is a reference signal so that an output signal, resulting in closing of a switch for paralleling the generator, is produced only when a predetermined relation exists between the AC waveforms.

3,588,520

HIGH-VOLTAGE ELECTRIC CIRCUIT BREAKER WITH HIGH-SPEED STRIPPING MEANS

Philip Barkan, Media, and Peter Kotos, Havertown, Pa., assignors to General Electric Company

Filed Oct. 29, 1969, Ser. No. 872,000
Int. Cl. H01h *31/00*
U.S. Cl. 307—112 **6 Claims**



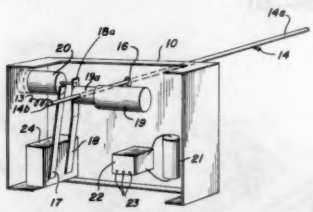
Relates to a high-voltage electric circuit breaker with high-speed tripping means comprising a capacitor located in a region of line potential. Tripping is effected by discharging the capacitor. The capacitor is maintained in a charged condition by means comprising a hydraulic motor in the region of line potential, a pump in a region of ground potential, and a hydraulic circuit interconnecting the pump and motor. The hydraulic circuit has portions extending between said line potential region and said ground potential region which are primarily of electrical insulating material.

3,588,521

LEVEL RESPONSIVE APPARATUS

Leslie F. Stone, Westchester, Ill. 60153

Filed Apr. 15, 1969, Ser. No. 816,219
Int. Cl. H01h *35/18*
U.S. Cl. 307—118 **5 Claims**

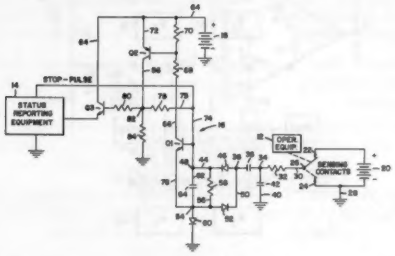


The present invention involves a device for detecting and controlling the level of finely divided or granular material discharged into a receptacle. The device includes a rod or probe extending through the walls of the receptacle into its interior. By means of electrically activated components the rod is caused to pulsate within the interior of the receptacle until such time as the level of material in the receptacle prevents its continued movement. The flow of material into the receptacle from a source of supply is, in turn, controlled by the movement of the rod or probe.

3,588,522
POWER CONTROL CIRCUIT FOR REMOTE DATA RECORDER SYSTEM

James H. Blossom, Amarillo, Tex., assignor to Seismograph Service Corporation, Tulsa, Okla.

Filed Mar. 12, 1969, Ser. No. 806,361
Int. Cl. H01b 1/24
U.S. Cl. 307—125 6 Claims

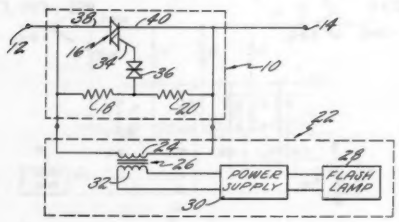


A control device for use with data transmission apparatus connected to equipment at a remote installation and responsive to a change of status input from the equipment to close a circuit from a power source to the data transmission apparatus to thereby facilitate the reporting of the status change to a central station.

3,588,523
REGULATED SERIES TO MULTIPLE POWER CONVERTER

Donald L. Grafton, Windsor, and George M. Gifford, Winchester Center, Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed June 25, 1969, Ser. No. 836,561
Int. Cl. H01h 47/00
U.S. Cl. 307—132 6 Claims

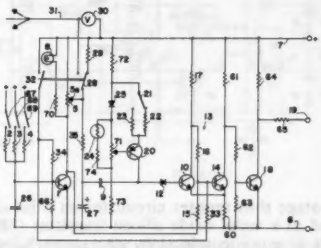


A unit is designed to be placed in series with a plurality of series runway marker lights in an airport lightning system, and employs a bidirectional thyrister responsive to line voltage of a determinable amount to short circuit the unit in each half-cycle of the alternating current power. The unit includes current-responsive power conversion means to supply power suitable for use in a flash lamp. In a second embodiment, silicon-controlled rectifiers, one for each half-cycle of the AC power, are fired to cause short circuiting of the unit when the predetermined desired maximum voltage is reached. In each embodiment, the voltage-responsive device includes a voltage divider across the unit and a bilateral avalanche switching device.

3,588,524
ELECTRONIC TIMER

Gerhard Lerch, Weilheim, Germany, assignor to Krauss-Maffei Aktiengesellschaft, Munich, Germany

Filed Sept. 16, 1969, Ser. No. 858,279
Claims priority, application Germany, Sept. 20, 1968, P 17 88 034.1
Int. Cl. H01b 7/00; H03k 17/26; H01h 47/18
U.S. Cl. 307—141 14 Claims

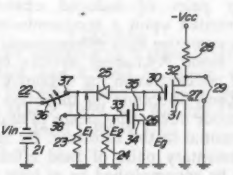


An electronic timer has a normally conductive two-stage transistor amplifier energized via a constant-current transistor connected in series with the base-emitter circuit of the first amplifier stage. Through a condenser connected to the junction of a normally cutoff input transistor and an adjustable voltage divider, a blocking potential is momentarily impressed upon the base of this stage as the input transistor is rendered conductive by a trigger signal applied thereto. This reversal temporarily blocks the first amplifier stage whereas the second stage is maintained conductive until the first stage is again turned on as the condenser is recharged at a fixed rate through the constant-current transistor; the end of the off-period of the first state, whose duration depends on the setting of the voltage divider, causes the emission of an output signal by the cutoff of the second stage.

3,588,525
CHATTERING PREVENTING CIRCUIT

Yoshikazu Hatsukano, and Hajime Tsugihashi, Kodaira-shi, Japan, assignors to Hitachi, Ltd., Chiyoda-Ku, Tokyo, Japan

Filed Dec. 12, 1967, Ser. No. 689,984
Claims priority, application Japan, Dec. 16, 1966, 41/114207
Int. Cl. H02h 7/20
U.S. Cl. 307—202 7 Claims

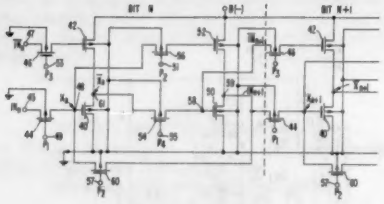


A chattering preventing circuit wherein an electrical pulse signal containing chattering waveforms generated by turning on and off a predetermined electric circuit by means of a mechanical switch is supplied to the gate electrode of an MOS type field effect transistor through a diode, and a pulse signal containing no chattering waveform is obtained in an output circuit connected with the drain electrode of said transistor by virtue of the charge-discharge phenomenon of the gate input capacitance of said transistor.

3,588,526
SHIFT REGISTER USING METAL OXIDE SILICON TRANSISTORS

James Ronald Cricchi, Catonsville, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 4, 1969, Ser. No. 813,442
Int. Cl. G11c 19/00
U.S. Cl. 307—221 12 Claims

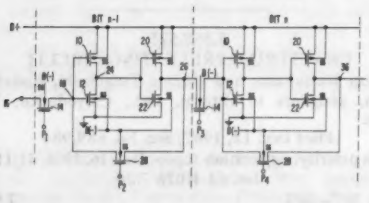


A two-stage shift register circuit for an *n* bit shift register comprised of a metal oxide silicon transistor (MOST) array of a single-type semiconductivity wherein each stage includes a load MOST and a switching MOST and wherein a separate gating MOST is coupled to each load and switching MOST of both stages and operated from a four-phase synchronized clock source so that the load and switching MOST in each stage are operated in push-pull relationship for reducing the power drawn during static conditions and reducing the propagation time from the input and output of each bit.

3,588,527
SHIFT REGISTER USING COMPLEMENTARY INDUCED CHANNEL FIELD EFFECT SEMICONDUCTOR DEVICES

James Ronald Cricchi, Catonsville, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 4, 1969, Ser. No. 813,443
Int. Cl. G11c 19/00
U.S. Cl. 307—221 10 Claims



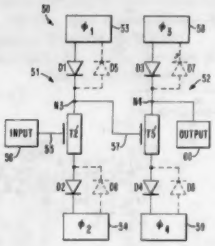
An *n*-bit shift register wherein each bit is comprised of complementary pairs of induced channel field effect transistors fabricated upon a semiconductor substrate and being doped to comprise both enhancement mode P-channel and depletion mode N-channel devices by predetermined doping surface concentration for obtaining faster operation time but effectively operating the depletion mode devices as enhancement mode devices by means of applying a predetermined bias potential to the substrate. By selective grouping of the complementary pairs of field effect transistors the operation may be accomplished by as little as a single-clock signal.

3,588,528
A FOUR PHASE DIODE-FET SHIFT REGISTER

Lewis M. Terman, South Salem, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1969, Ser. No. 837,704
Int. Cl. G11c 19/00
U.S. Cl. 307—221 13 Claims

A four phase diode-field-effect effect transistor shift register stage is disclosed. Each register stage includes two identical circuits each comprising two diodes and a field-effect transistor. Each circuit contains a node which is connected to the gate of the field effect transistor of a succeeding circuit or to the first circuit of a similar shaft register stage. Pulsed voltage sources Φ1 and Φ2 are serially disposed in one of the circuits and pulsed voltage sources Φ3 and Φ4 are serially disposed in the other of the circuits of each shift register stage. Depending on whether the field effect transistors are N-channel or P-channel, pulsed voltages of the

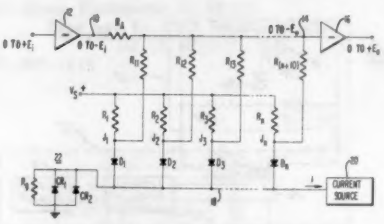


proper polarity are applied in sequence to apply a voltage to the node of each circuit in turn. If the FET of the first circuit of a stage is conditioned by placing information on its gate, and Φ1 and Φ2 pulses are applied to the circuit in sequence, the gate capacitance of the FET of the succeeding circuit is conditioned, in response thereto. Upon application of the Φ3 and Φ4 pulses to the succeeding circuit, the information pulse on the gate capacitance of the field-effect transistor of the succeeding circuit is transferred in inverted form to its output.

3,588,529
CURRENT MODE DIODE FUNCTION GENERATOR

J. Paul Jordan, Jr., and Robert A. Leightner, Burlington, Vt., assignors to General Electric Company

Filed Sept. 23, 1968, Ser. No. 761,671
Int. Cl. G06g 7/12
U.S. Cl. 307—229 5 Claims

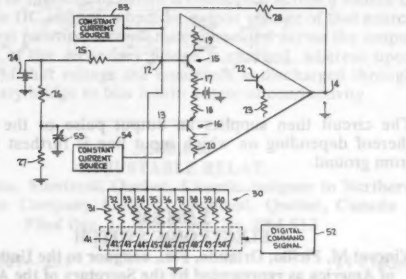


An input voltage representing a first variable is transformed into an output voltage representing a second variable or desired function by a circuit including a plurality of slope-changing networks, each of which includes a pair of resistors and a diode. Each diode is normally conducting and effectively removes one resistor of the pair from the circuit. As the input voltage increases, current flow through the resistor pair equalizes at a point determined by their values, thereby making the diode nonconductive and introducing both resistors of the pair into circuit. By appropriate choice of resistor values, the slope-changing networks "switch" in series, thereby producing a corresponding plurality of line segments approximating the desired function.

3,588,530
COMPUTER CIRCUIT

Marion J. Langan, Huntsville, Ala., assignor to Avco Corporation, Huntsville, Ala.

Filed Nov. 10, 1969, Ser. No. 875,262
Int. Cl. G06g 7/12; H03k 5/20
U.S. Cl. 307—229 14 Claims

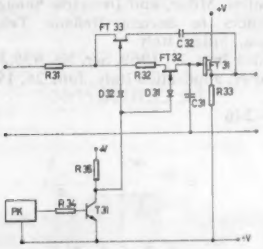


A digital-to-analog converter includes a differential, operational amplifier having a negative feedback path from the amplifier output terminal to the amplifier inverting input terminal and a series impedance connected between the amplifier inverting input terminal and a voltage source, which may be fixed or variable. Connected in shunt with the amplifier inverting input terminal and ground is a variable resistance controlled in response to digital control signals. A predetermined percentage of the voltage of the source is connected to the amplifier noninverting input terminal. The relative magnitudes of the feedback and input impedances and the predetermined percentage of the voltage applied to the noninverting input terminal are adjusted so that the amplifier output voltage is proportional to a predetermined constant of the input voltage divided by the magnitude of the shunt impedance. A constant current source supplies bias current to the amplifier via the inverting input terminal.

3,588,531
ANALOG NETWORK BASED ON SAMPLING FOR UNIVERSAL APPLICATIONS FILTER

Hakon Einar Bjor, Oslo, Norway, assignor to Sentralinstitutt for Industriell Forskning, Oslo, Norway

Filed Nov. 26, 1968, Ser. No. 779,185
Int. Cl. G06g 7/12; H03k 5/20
U.S. Cl. 307—229 9 Claims

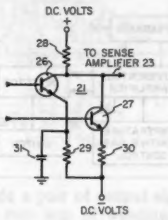


The present filter for filtering analog signals is based on the use of analog networks in which the signals are integrated over time so as to select out a desired frequency range, and is characterized by means for integrating the signals only over separate time intervals, the mutual time spacing of which is shorter than the period of the signals in said desired frequency range. In the case of an electrical filter circuit comprising at least one capacitor there is provided a switching element effectively in series with each capacitor, said switching element being closed during said separate time intervals.

3,588,532
MEMORY SENSING CIRCUIT INCLUDING A COMBINED ADDER AND AMPLIFIER STAGE

Frank Fellinger, West Lafayette, Ind., assignor to GTE Automatic Electric Laboratories Incorporated

Filed Sept. 4, 1969, Ser. No. 855,291
Int. Cl. H03k 5/20
U.S. Cl. 307—233 3 Claims

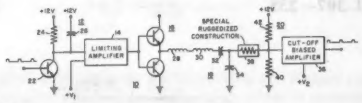


In circuits for sensing the switching of cores in two-wire, 2½D memories, a pair of transistors are connected to function as a differential adder at low frequencies to eliminate a pedestal voltage that is split into two signals of opposite polarity by a preceding differential amplifier circuit, and to function as an amplifier at higher frequencies to amplify signals resulting from the switching of cores.

3,588,533
LOW FREQUENCY BAND-PASS FILTER FOR USE IN FAILSAFE APPLICATIONS

Richard S. Rhoton, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 15, 1968, Ser. No. 752,824
Int. Cl. H03k 5/08
U.S. Cl. 307—233 9 Claims

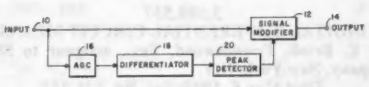


A low frequency band-pass filter is of a construction inherently providing a single predetermined output mode under any conditions of failure of its individual components or combinations thereof. The filter employs cooperation between the Q of a resonant circuit, a resistive divider, and a threshold circuit to define pass bandwidth.

3,588,534
PEAK-SLOPE FREQUENCY DISCRIMINATOR

Robert J. Campbell, and Roland W. Koch, Cedar Rapids, Iowa, assignors to Collins Radio Company, Dallas, Tex.

Filed May 7, 1969, Ser. No. 822,579
Int. Cl. H03k 5/20
U.S. Cl. 307—233 14 Claims

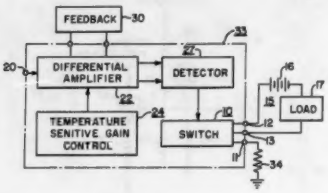


Disclosed is a frequency dependent signal modification means which may function as a filter and which utilizes a signal differentiator and peak detector to control operation as a function of frequency.

3,588,535
CONTROL CIRCUIT WITH TEMPERATURE COMPENSATION

Melbourne J. Hellstrom, Severna Park, and Charles L. Laughinghouse, Linthicum, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 22, 1967, Ser. No. 662,494
Int. Cl. H03k *5/20*
U.S. Cl. 307—235 **3 Claims**

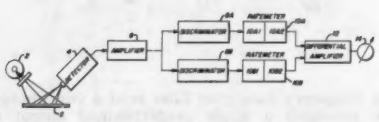


A circuit which will switch power to load in response to a prescribed input signal includes as the switch means, a silicon-controlled rectifier (SCR) having a firing voltage which changes with temperature. A differential amplifier receives an input signal and provides a differential output signal to a complementary detector, the output signal of which is utilized to trigger the SCR to its on state of operation. A current source transistor is provided to control the current in the differential amplifier, and as temperature changes the current source transistor varies the current in the differential amplifier in order to change the gain thereof so that the output of the complementary detector provides a temperature-compensated signal for firing the SCR at the proper signal level.

3,588,536
PULSE HEIGHT ANALYZER

George Dykeman, Dormont Borough, Pa., assignor to United States Steel Corporation

Filed July 16, 1968, Ser. No. 745,342
Int. Cl. G01r *29/02*; **H03k** *4/78*
U.S. Cl. 307—235 **4 Claims**



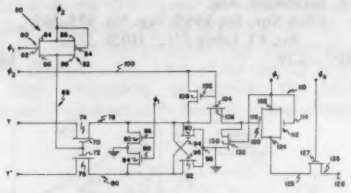
A pulse height analyzer particularly for use with a coating thickness gauge including a thin window X-ray tube, a thin window proportional detector, a linear amplifier connected to the detector, a pair of discriminators connected in parallel to the amplifier, a counting rate meter connected to each discriminator and providing rate signals proportional to numbers of various level pulses detected, and a differential amplifier connected to the outputs of the rate meters and providing pulse rate information for a specific radiation pulse level band. Also, a reverse biased tunnel diode discriminator having means to block negative going signals in series with the input to the cathode of the tunnel diode.

3,588,537
DIGITAL DIFFERENTIAL CIRCUIT MEANS

Robert E. Brink, Friendswood, Tex., assignor to Shell Oil Company, New York, N.Y.

Filed May 5, 1969, Ser. No. 821,757
Int. Cl. H03k *5/20*
U.S. Cl. 307—235 **7 Claims**

A field-effect transistor circuit for detecting and amplifying differential digital signals. The input to the circuit includes transistors that isolate the circuit from its external environment while the internal circuit is being initialized. Then on interrogation, cross-coupled asymmetrical FETs detect which of two input lines is furthest removed from ground potential.

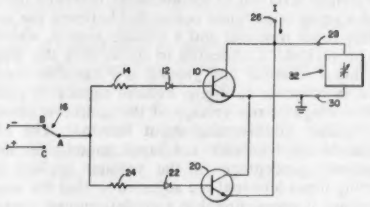


The circuit then supplies an output pulse or the absence thereof depending on which input line is furthest removed from ground.

3,588,538
ELECTRONIC SWITCH

Vincent M. Picillo, Orlando, Fla., assignor to the United States of America as represented by the Secretary of the Army

Filed Jan. 26, 1968, Ser. No. 701,004
Int. Cl. H03k *17/00*
U.S. Cl. 307—246 **4 Claims**

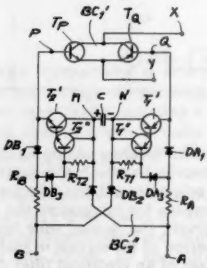


An electronic switch that utilizes the parallel connection of a transistor switching circuit with an inverted-transistor switching circuit for discharging integrating capacitors regardless of the charge polarity on the capacitors. Diodes connected to the base of each transistor prevent reverse voltage breakdown of the base-collector and base-emitter junctions. The switch offers a low saturation voltage for both positive and negative load voltages, good control of switching variables and transients, and has a fast response time.

3,588,539
GATING NETWORK FOR TIME-SHARING COMMUNICATION SYSTEM

Arnaldo Vicentini, Milan, and Demetrio Sonaglioni, Arnaldi, Italy, assignors to Societa Italiana Telecomunicazioni Siemens S.p.a., Milan, Italy

Filed June 23, 1969, Ser. No. 835,374
Claims priority, application Italy, June 26, 1968, 18231A
Int. Cl. H03k *17/00*
U.S. Cl. 307—246 **6 Claims**



A gating network for intermittently connecting a signal generator to a load, e.g. for use in a time-sharing telecommu-

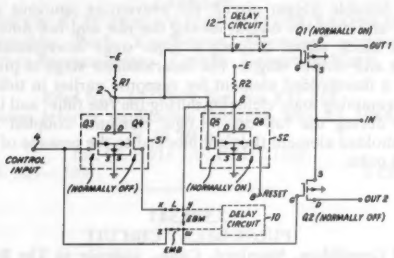
nication system, includes a normally blocked primary bridge circuit formed by four diodes, or by the emitter-base and collector-base circuits of two complementary transistors connected in tandem, whose output diagonal is in series with the signal path and whose input diagonal is connected between intermediate points of two nonadjoining high-resistance arms of a secondary bridge circuit also having two low-resistance arms. All the arms of the secondary bridge circuit include diodes having the same orientation with reference to an input diagonal of that circuit which is connected across a source of reversible DC voltage; when the output voltage of that source is of a first polarity, a condenser connected across the output diagonal of the secondary bridge is charged, whereas upon reversal of that voltage the condenser is discharged through the primary bridge to bias it into a state of conductivity.

3,588,540

ADJUSTABLE RELAY

John Bohn, Montreal, Quebec, Canada, assignor to Northern Electric Company Limited, Montreal, Quebec, Canada

Filed Dec. 12, 1969, Ser. No. 884,513
Int. Cl. H03k *17/60*
U.S. Cl. 307—251 **11 Claims**



First and second metal insulator semiconductor field-effect transistors (MIS-FET's) have their sources connected together and to an input, and their drains connected to separate outputs, to constitute transfer contacts of a relay. The transistors are controlled by a pair of MIS-FET switches each having two inputs and an output. The first switch has one input connected to a control terminal and its output connected both to one input of the second switch and to the gate of the first transistor. The gate of the second transistor can be connected either to the control input (providing, e.g., early make-break operation) or to the output of the second switch (providing, e.g., early break-make operation). In the latter case the second switch output can also be connected to the second input of the first switch, providing latching operation, in which case the relay is reset by a reset voltage applied to the second input of the second switch.

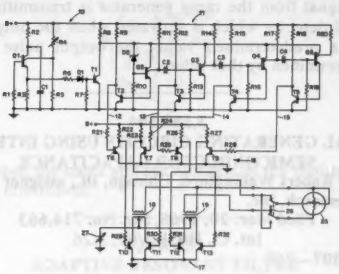
3,588,541

PULSE-GENERATING APPARATUS

Joseph Y. Chan, Chelmsford, and Dinesh C. Gupta, Cambridge, Mass., assignors to General Telephone & Electronics Laboratories, Incorporated

Filed Dec. 22, 1969, Ser. No. 886,973
Int. Cl. H03k *21/00, 17/00*
U.S. Cl. 307—252G **7 Claims**

Pulse-generating apparatus employing four silicon-controlled switches and four corresponding transistors. The four silicon-controlled switches are coupled to a source of trigger pulses and to each other whereby trigger pulses cause each silicon-controlled switch together with its corresponding transistor to be rendered conductive in sequence, thereby producing a continuous series of output pulses at the collectors of each of the transistors in succession. These output pulses are coupled through an arrangement of transistors and



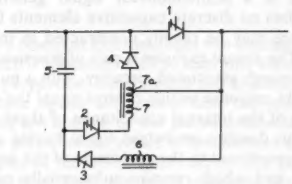
transformers to provide a pair of output signals displaced in phase by 90° to the two sets of windings of a two-phase synchronous electrical motor.

3,588,542

CIRCUIT ARRANGEMENT FOR IMPROVING COMMUTATION OF THYRISTORS

Peter Knapp, Muhleweg, Switzerland, assignor to Aktiengesellschaft Brown, Boveri & Cie, Baden, Switzerland

Filed May 19, 1969, Ser. No. 825,540
Claims priority, application Switzerland, May 21, 1968, 7554/68
Int. Cl. H03k *17/00*
U.S. Cl. 307—252 **3 Claims**



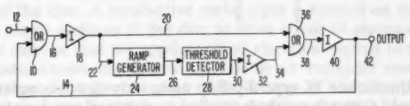
In a circuit arrangement for improving the forced commutation of thyristor-direct current setters wherein quenching of the thyristor is effected by commutating the load current to a condenser, the voltage appearing on the condenser is divided by means of an autotransformer, and only a partial voltage as determined by the diving ratio of the transformer is supplied to the thyristor for quenching. Because of the voltage division, there is no temporary increase in the load voltage during commutation.

3,588,543

SEMICONDUCTOR PULSE GENERATOR INCLUDING LOGIC GATES, RAMP GENERATOR AND THRESHOLD DETECTOR FOR PROVIDING CONTROLLED-WIDTH RECTANGULAR PULSES

Harold L. Schwartz, Philadelphia, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Continuation of application Ser. No. 687,297, Dec. 1, 1967, now abandoned. This application Jan. 20, 1970, Ser. No. 4,461
Int. Cl. H03k *1/18*
U.S. Cl. 307—265 **2 Claims**



A pulse generator which comprises a system of interconnected semiconductor logic units which includes a ramp

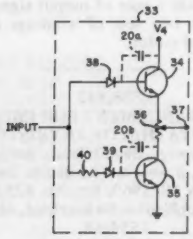
generator and threshold detector combination. An input signal pulse activates the ramp generator. The ramp generator includes a capacitor and transistor which maintain the charging current for the capacitor at a constant value. The output signal from the ramp generator is transmitted to the threshold detector which is activated when the output signal reaches a predetermined value, the output pulse duration being determined by that value.

3,588,544

SIGNAL GENERATING CIRCUITS USING INTERNAL SEMICONDUCTOR CAPACITANCE

Clarence Robert Wallingford, Chicago, Ill., assignor to Hazeltine Research, Inc.

Filed Mar. 20, 1968, Ser. No. 714,663
Int. Cl. H03k *5/00, 3/26*
U.S. Cl. 307—268 **3 Claims**



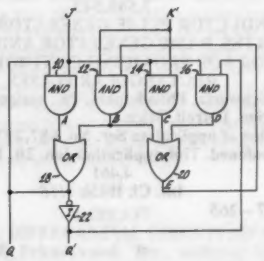
Disclosed is a semiconductor signal generating circuit which requires no discrete capacitive elements for operation and therefore may be readily constructed in integrated circuit form. The circuit includes a pair of transistors which are supplied, through associated circuitry, with a pulse-type control signal. In response to this control signal the charging and discharging of the internal capacitance of these transistors is controlled to develop an output signal having an amplitude which is proportional to the amplitude of the supplied pulse-type signal and which remains substantially constant for a selected time interval.

3,588,545

J-K' FLIP-FLOP USING DIRECT COUPLED GATES

Carl Macey Wright, Cinnaminson, N.J., assignor to RCA Corporation

Filed Nov. 12, 1969, Ser. No. 875,711
Int. Cl. H03k *3/12*
U.S. Cl. 307—289 **8 Claims**



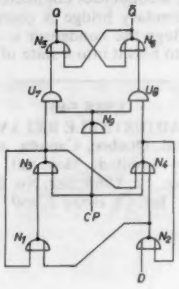
Unclocked JK-type flip-flop using only direct-coupled logic gates. Activating signals applied to either of two inputs cause the flip-flop to assume a state corresponding to the activated input. Activating signals applied to both inputs simultaneously cause the flip-flop to change state.

3,588,546

BISTABLE TRIGGER CIRCUIT HAVING DIFFERENT VOLTAGE THRESHOLD

Klaus Lagemann, Garstedt, Germany, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Nov. 28, 1967, Ser. No. 686,144
Claims priority, application Germany, Nov. 29, 1966, P40894
Int. Cl. H03k *3/26, 19/34*
U.S. Cl. 307—291 **6 Claims**



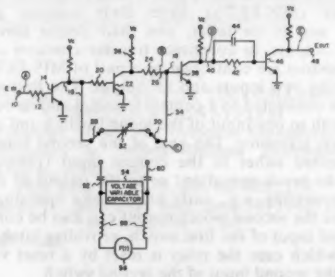
A bistable trigger circuit for preventing spurious signals from affecting the output during the rise and fall time of an input clock signal utilizing a logic stage intermediate the input and output stages. The intermediate stage is provided with a thresholded element for response earlier in time than the remaining logic elements during the rise time, and later in time during the fall time. Logic elements coupled to the thresholded element thus are blocked to the passage of a spurious pulse.

3,588,547

PULSE DELAY CIRCUIT

Carl Greenblum, Stamford, Conn., assignor to The Bunker-Ramo Corporation, Stamford, Conn.

Filed July 10, 1969, Ser. No. 840,741
Int. Cl. H03k *17/26, 1/14*
U.S. Cl. 307—293 **10 Claims**



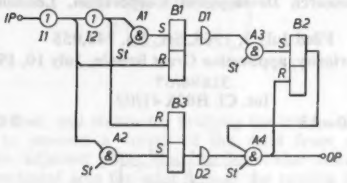
A circuit for providing a relatively large and easily varied delay of randomly received pulses without causing significant distortion of the pulse shape. The leading edge of the pulse is converted into a first decaying pulse and the trailing edge into a second decaying pulse. These decaying pulses, which are of opposite polarity, are applied to a summing point, the other input to which is a reference pulse which begins and ends at the same time as the input pulse and is of the same polarity as the second decaying pulse. The summing point is the input to a threshold circuit which is adapted to start generating an output when the first decaying pulse has decayed to a first predetermined value and to stop generating an output when the second decaying pulse has decayed to a second predetermined value. The output from the threshold circuit is the desired delayed pulse.

3,588,548

DIGITAL LOW PASS FILTERS

Ioan Hugh Williams, Ammanford, Wales, assignor to Telephone Manufacturing Company Limited

Filed Jan. 21, 1969, Ser. No. 792,308
Claims priority, application Great Britain, Feb. 8, 1968, 6265/68
Int. Cl. H03k *1/16*
U.S. Cl. 307—295 9 Claims



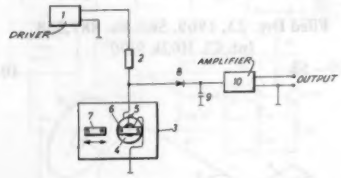
A low pass filter with sharp cutoff having a bandwidth variable at will employing digital circuitry.

3,588,549

MAGNETIC ELECTRIC SWITCH WITHOUT CONTACTS

Hans-Joachim Buch, Kaufbeuren, Germany, assignor to Walther-Buromaschinen GmbH, Gerstetten-Wurtt, Germany

Filed Nov. 17, 1969, Ser. No. 877,215
Claims priority, application Germany, Nov. 23, 1968, P 18 10 613.3
Int. Cl. H01r *5/0*; H01f *21/00*
U.S. Cl. 307—309 5 Claims



A magnetic electric switch without contacts has a driver stage generating a pulsed current to a coil of a switch element with an output amplifier being also connected to the coil through a diode and capacitor. The switch element coil is around a ferromagnetic core and a permanent magnet establishes a magnetic field blocking magnetically the core. The switch element also has a second permanent magnet displaceable toward and away from the first permanent magnet with its magnetic poles oppositely disposed from the poles of the first magnet so that movement of the second magnet toward the first magnet counteracts the blocking magnetic field and the amplifier is charged through the capacitor into the ON state. The second magnet is moved away from the first magnet so that the core again becomes magnetically blocked and the amplifier output indicates an OFF state.

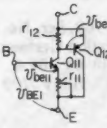
3,588,550

A COMPOSITE TRANSISTOR CIRCUIT HAVING A CONTROLLABLE VBE

Toshiyuki Matsuda, Tokyo, Japan, assignor to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 27, 1968, Ser. No. 755,600
Claims priority, application Japan, Aug. 30, 1967, 42/55194
Int. Cl. H03k *1/00*
U.S. Cl. 307—313 1 Claim

A composite transistor circuit comprising two or more transistors is used in a current converting circuit. The voltages between the bases and the emitters of the transistors can be simply controlled.

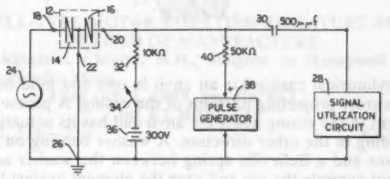


3,588,551

ADAPTIVE RESONANT FILTER

Stuart S. Perlman, and Joseph H. McCusker, Princeton, N.J., assignors to RCA Corporation

Filed Jan. 24, 1969, Ser. No. 793,872
Int. Cl. H01v *7/00*
U.S. Cl. 310—8.1 17 Claims



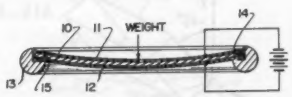
An adaptive resonant filter includes two mechanically coupled piezoelectric elements with at least one element having ferroelectric properties. Input signals are applied to one element and output signals are derived from the other element. Voltage pulses are applied to the piezoferroelectric element to control the piezoelectric effect of the element and thereby control the level of the filter signal output. The piezoelectric elements can have their electrical contacts segmented to form multiple elements one of which can provide a feedback signal or voltage connected as part of an oscillator.

3,588,552

PRESTRESSED PIEZOELECTRIC AUDIO TRANSDUCER

Hugo W. Schafft, Des Plaines, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Sept. 23, 1969, Ser. No. 860,218
Int. Cl. H01v *7/00*
U.S. Cl. 310—8.7 12 Claims



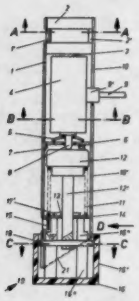
A combination piezoelectric transducer and diaphragm including a thin circular disc of polarized piezoelectric ceramic material stressed into a dish-shaped configuration and confined in that configuration by a metal ring attached to the edge of the disc. A conductive metal layer is formed on each of the major surfaces of the disc to form a pair of electrodes for the disc, so that the application of electrical signals to the electrodes causes the disc to operate in an expander mode, thereby producing movement of the center of the disc in a direction perpendicular to the major surfaces thereof. Movement of the center of the disc in a perpendicular direction to the major surfaces thereof causes a corresponding electrical signal to be generated across the electrodes.

3,588,553

PIEZOELECTRIC LIGHTER

Dieter Westphal, Huckerswagen, and Gunter Mobus, Wermelskirchen, Germany, assignors to Joh. Vaillant, KG, Remscheid, Germany

Filed Oct. 8, 1969, Ser. No. 864,806
Claims priority, application Germany, Oct. 19, 1968, P 18 04 100.4
Int. Cl. H01v 7/00
U.S. Cl. 310—8.7 9 Claims



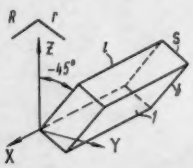
A cylindrical casing has an anvil in one end held in place by inwardly projecting portions of the casing. A piezoelectric element in the casing abuts the anvil and has its actuating pin extending in the other direction. A washer bearing on casing portions and a Belleville spring between the washer and the element encircle the pin and urge the element against the anvil. A striker has a head against the pin and a post extending in the other direction. A spring encircles the post and bears on a disc restrained by the casing and against the head to urge the striker towards the pin. The other end of the casing forms a sawtooth cam on which rides a cam follower attached to the post. The cam follower is connected to a rotatable cap for rotation therewith while permitting axial movement of the follower in the cap.

3,588,554

PIEZOELECTRIC QUARTZ VIBRATOR

Petr Grigorievich Pozdnyakov, Otkrytoe shosse, 23. Kprpus 1, Kv. 26, and Valentina Georgievna Androsova, Tovarischeskaya ulitsa, 23, Korpus 1, Kv. 63, Moscow, U.S.S.R.

Filed Feb. 12, 1969, Ser. No. 798,710
Int. Cl. H01v 7/00
U.S. Cl. 310—9.5 4 Claims



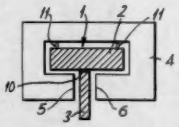
A piezoelectric quartz vibrator with a crystalline quartz element having the form of a bar of rectangular cross section so cut relative to the orthogonal axes of the quartz crystal that the length of the crystal line quartz element is disposed in the direction of the X-axis of the quartz crystal and the wider side surfaces are almost parallel to the side surface R of the major rhombohedron of the quartz crystal and form with other axes Y and Z of the quartz crystal angles approximating 45°. Electrodes of opposite polarity of the piezoelectric quartz vibrator are disposed on at least one pair of the opposite side surfaces of the crystalline element. The piezoelectric quartz vibrator has a low (zero) temperature coefficient of frequency which is controlled by changing the ration of the thickness to the width of the crystalline quartz element at a constant value of its cut angle.

3,588,555

LINEAR ELECTRIC DRIVE WITH WINDINGLESS CARRIAGE MEANS AT LEAST PARTIALLY EMBRACING CONDUCTIVE RAIL MEANS

Eric Roberts Laithwaite, Ditton Hill, Surbiton, Surrey, and Hugh Robert Bolton, London, England, assignors to National Research Development Corporation, London, England

Filed July 2, 1968, Ser. No. 742,055
Claims priority, application Great Britain, July 10, 1967, 31694/67
Int. Cl. H02k 41/02
U.S. Cl. 310—13 9 Claims



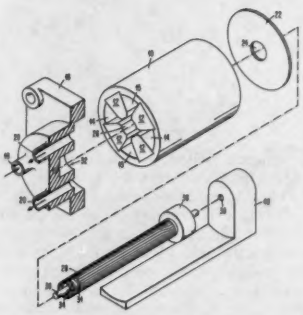
A rail carriage is propelled by the reaction between a magnetic circuit carried by the carriage and which has a gap the magnetic circuit being energized from an AC current carrying conductor and a conductor rail lying in the gap. The reaction may be produced by a gap of varying dimensions, by shaded-poles or by a two-phase supply.

3,588,556

LOW IMPEDANCE TRANSVERSE COOLING OF ELECTRIC MOTORS

Adolfo M. Guzman, and Paul Y. Hu, Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1969, Ser. No. 887,568
Int. Cl. H02k 9/00
U.S. Cl. 310—58 10 Claims



An electric motor with a low inertia armature having a transverse cooling airflow from a high pressure chamber to a low pressure chamber in a direction parallel to and in contact with the circumference of the armature.

3,588,557

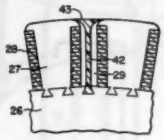
LOW LOSS VENTILATION FOR SALIENT POLE MACHINES

Lee A. Kilgore, Export, Pa.; Ragnvald Fergestad, and Tor Schanche, Drammen, Norway, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 19, 1969, Ser. No. 800,400
Int. Cl. H02h 9/00
U.S. Cl. 310—60 3 Claims

A ventilation arrangement for a dynamoelectric machine having a rotor including salient pole members. Structure is

provided for substantially increasing cooling efficiency and reducing windage looses in the machine, the structure comprising means for directing a cooling gaseous fluid axially of the rotor between the salient poles from one end of the rotor



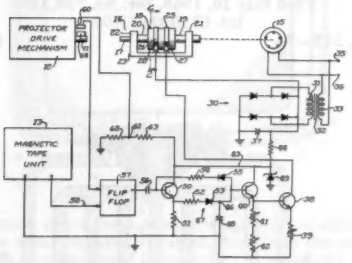
to the other, and means for bridging the interpolar space in order to prevent a vortex of the fluid from developing between adjacent poles, and for otherwise restricting the cross-sectional area for axial flow of the cooling fluid to increase the axial velocity thereof.

3,588,558

MAGNETIC CLUTCH PROJECTOR DRIVE SYSTEM

Herman Levin, Ft. Collins, Colo., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 30, 1969, Ser. No. 889,324
Int. Cl. H02k *49/02;* **G03b** *31/04*
U.S. Cl. 310—93 **5 Claims**



Drive system for a synchronized motion picture projector in which a projector drive mechanism is coupled through an electromagnetic clutch to a drive motor, preferably an induction motor. The clutch is controlled through a power transistor controlled through a buffer transistor from a bootstrap transistor integrator to which pulses are applied from a flip-flop responsive to reference pulses reproduced from magnetic tape and to pulses from a reed switch of the projector drive mechanism.

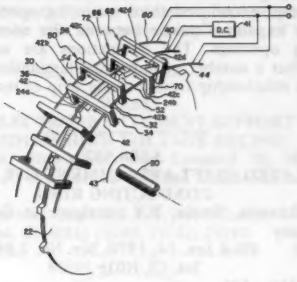
3,588,559

INDUCTOR GENERATOR STRUCTURE

Peter Fono, Anaheim, Calif., assignor to North American Rockwell Corporation

Filed July 25, 1969, Ser. No. 844,773
Int. Cl. H02k *17/42*
U.S. Cl. 310—168 **22 Claims**

An electric generator having a plurality of axial air gaps which are formed by respective horseshoe magnets, preferably electromagnets, disposed evenly around a circle so that a toothed iron rotor will have its teeth pass through the air gaps as the rotor rotates. The number of magnets is preferably twice the number of teeth on the rotor. Through alternate magnets is threaded a toroidal coil and through the other magnets is threaded another toroidal coil. As a tooth enters an air gap of a horseshoe magnet, the flux surrounding the particular coil passing through the magnet will increase and then the flux decreases as the tooth moves out, producing a voltage pulse in the particular coil. Since as a particular tooth moves through the air gaps the pulse is produced first



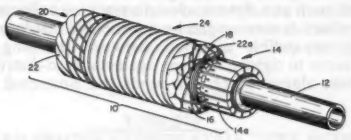
in one coil and then the other, the two coils are coupled together to produce an alternating voltage.

3,588,560

SHELL-TYPE MOTOR ROTATING ARMATURE AND METHOD OF MANUFACTURE

Hans Akselsen, Chester, N.H., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 2, 1969, Ser. No. 863,117
Int. Cl. H02k *3/46*
U.S. Cl. 310—214 **6 Claims**



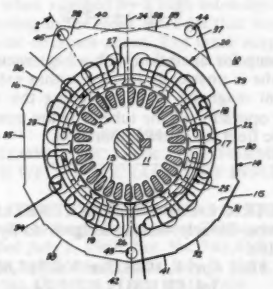
A shell-type motor armature with two layers of glass fibers disposed about the coils thereof one layer being disposed on a bias with respect to the axis of the armature and the other layer being transverse thereto. A bonding agent associated with the coils and the layers provides a unitary rigid structure.

3,588,561

DYNAMOELECTRIC MACHINE STATOR AND LAMINATIONS FOR USE IN SAME

William R. Hoffmeyer, Holland, and Alvin L. Rediger, Zeeland, Mich., assignors to General Electric Company

Filed July 9, 1969, Ser. No. 840,188
Int. Cl. H02k *1/06*
U.S. Cl. 310—216 **9 Claims**



A dynamoelectric machine stator core of stacked laminations includes a yoke section, a bore inside the yoke section

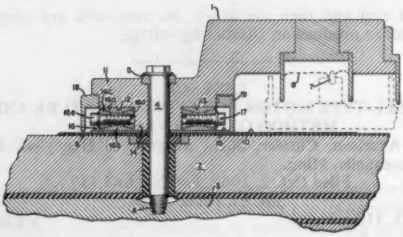
and winding receiving slots extending inwardly from the yoke section. A first mounting opening is formed in the core outside the slots while second and third mounting openings are formed in core material radially outward of the yoke section. The angular distance between the first mounting opening and each of the second and third mounting openings is greater than the angular distance between the second and third mounting openings. The laminations are so shaped and formed that a number of individual laminations are severed in nested relationship from a single strip of magnetic material.

3,588,562

INSULATED SHAFT ATTACHMENT FOR ROTATING CONDUCTING RING

Finn Dahlstrom, Scotia, N.Y., assignor to General Electric Company

Filed Jan. 14, 1970, Ser. No. 2,882
Int. Cl. H01r *39/08*
U.S. Cl. 310—232 **2 Claims**



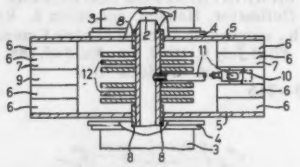
A construction for attaching an electrically conductive ring member, such as a dynamoelectric machine collector ring, to a shaft which is surrounded by a protected insulating sheath. Radially expandible members between the ring and the sheath serve to tighten the ring against a load-distributing intermediate sleeve which surrounds the protected insulated sheath.

3,588,563

ARRANGEMENT OF A HIGH VACUUM ELECTRONIC DISCHARGE TUBE PROVIDED WITH A GETTER ION PUMP OPERATING IN MAGNETIC FIELDS

Wolfgang Schmidt, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 19, 1969, Ser. No. 800,643
Claims priority, application Germany, Feb. 28, 1968, P 16 39 370.7
Int. Cl. H01j *7/16, 25/50*
U.S. Cl. 313—7 **3 Claims**



An ion pump for operation with a high vacuum electronic discharge tube is physically located within external columns of permanent magnetic discs producing the magnetic field required for operation of the tube. The ion pump uses part of this magnetic field for its own operation.

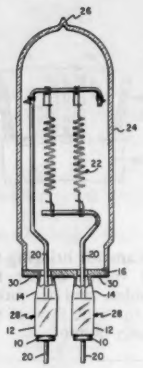
3,588,564

ELECTRIC LAMP WITH HEAT REFLECTOR

John J. Vetere, Beverly, Mass., assignor to Sylvania Electric Products Inc.

Filed Apr. 1, 1968, Ser. No. 717,806
Int. Cl. H01j *1/02, 7/24*
U.S. Cl. 313—43 **6 Claims**

An improved high wattage lamp where an external reflective coating of a refractory oxide is utilized to separate the filament assembly from the seal. The coating reflects the heat from the filament away from the seal area, thereby providing



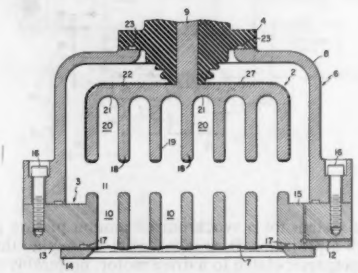
a cooler seal and also directs stray light rays back to the optical system.

3,588,565

LOW DOSE RATE HIGH OUTPUT ELECTRON BEAM TUBE

John G. Trump, 9 Cambridge St., Winchester, Mass. 01890

Filed May 20, 1968, Ser. No. 730,329
Int. Cl. H01j *33/00*
U.S. Cl. 313—74 **10 Claims**



Electrons having energy of the order of hundreds of kilovolts are produced over a wide area by a vacuum tight tube containing gas at low pressure which becomes ionized. Electrons are released at the cathode surface in hollow depressions in that surface extending over a large area by secondary emission caused by bombardment of the cathode surface with positive ions and by collision ionization processes in the gas. The electrons thus released are accelerated and focused into apertures in the anode which are covered with thin electron windows through which the electrons issue as uniform and parallel streams suitable for the simultaneous irradiation of coatings and like materials over a large area.

3,588,566

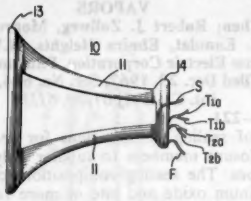
ELECTROMAGNETIC DEFLECTION YOKE HAVING BYPASSED WINDING TURNS

Robert Lloyd Barbin, Indianapolis, Ind., assignor to RCA Corporation

Filed July 24, 1969, Ser. No. 844,318
Int. Cl. H01j *29/76*
U.S. Cl. 313—76 **5 Claims**

A deflection yoke for a color television picture tube is pro-

vided the coils of which have electrical taps which are connected such that a portion of the coil windings are bypassed



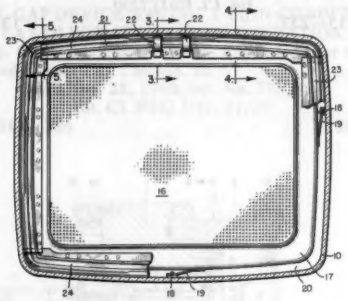
to provide an effective turns distribution modification to control the electron beam misconvergence.

3,588,567

SEGMENTED ELECTRON SHIELD FOR COLOR PICTURE TUBE

Gerald K. MacLean, Hoffman Estates, and Raymond J. Pekosh, Niles, Ill., assignors to Zenith Radio Corporation

Filed Mar. 23, 1970, Ser. No. 21,744
Int. Cl. H01j *1/53, 29/40*
U.S. Cl. 313—85 **2 Claims**



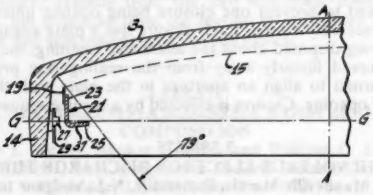
An electron shield for a shadow-mask-type of color tube bridges the space between the mask frame and the tube envelope. The electron shield is comprised of a plurality of segments each segment having one end which is curved to conform to the inside contour of the envelope corner in which it is placed. The other end of each shield segment is straight and slightly overlaps the curved end of the previously placed segment.

3,588,568

RECTANGULAR SHADOW-MASK-TYPE COLOR PICTURE TUBE WITH BARREL-SHAPED MASK FRAME

Frank M. Sohn, Lancaster, Pa., assignor to RCA Corporation

Filed Dec. 12, 1968, Ser. No. 783,186
Int. Cl. H01j *1/96, 19/50, 29/46*
U.S. Cl. 313—85 **6 Claims**



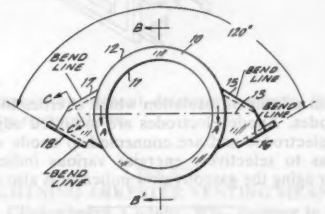
A rectangular shadow-mask-type color picture tube having a shadow mask comprising an apertured masking portion of spherical contour and having a rectangular peripheral skirt portion attached to one flange of a barrel-shaped rectangular frame of uniform L-shaped cross section, the other flange of which extends inwardly to serve as an electron shield for the skirt and one flange during overscan of the beam at maximum deflection angles. The difference in curvature of the long and short sides of the barrel-shaped frame is such that the portions of the frame to which the mounting springs are attached lie substantially in a common plane perpendicular to the central tube axis, thus permitting the use of identical springs.

3,588,569

FOCUSING ELECTRODE WITH BENT SUPPORT ARMS TO REDUCE HIGH VOLTAGE ARCING

John McQueen, Bloomfield, and Leonard D. Minutillo, Sayreville, N.J., assignors to Griffiths Electronics Inc., Linden, N.J.

Filed Mar. 28, 1969, Ser. No. 811,486
Int. Cl. H01j *19/38, 19/42, 29/46*
U.S. Cl. 313—85 **3 Claims**



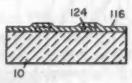
A focusing electrode for use in a cathode-ray-type kinescope having a pair of outwardly extending arms adapted for engagement with an included support securing that electrode in position with respect to other electron gun elements of the kinescope, with the outwardly extending arms having first and second bent extremities to provide the described engagement and in a manner presenting an overall surface area tending to lessen the possibility of arcing within the kinescope.

3,588,570

MASKED PHOTOCATHODE STRUCTURE WITH A MASKED, PATTERNED LAYER OF TITANIUM OXIDE

Terence W. O'Keeffe, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 29, 1968, Ser. No. 724,839
Int. Cl. H01j *39/06*
U.S. Cl. 313—94 **1 Claim**



A shadow mask particularly for use with ultraviolet sensitive photocathodes is provided of a material that does not transmit ultraviolet radiation and which, furthermore, does not absorb other wavelength radiation, such as visible. This permits the photocathode to be immediately adjacent the mask because when exposed by a high intensity light source appreciable heating in the mask material that would damage the photocathode does not occur. The mask may be, for example, an ultraviolet absorber, such as titanium ions in a titanium oxide.

3,588,571

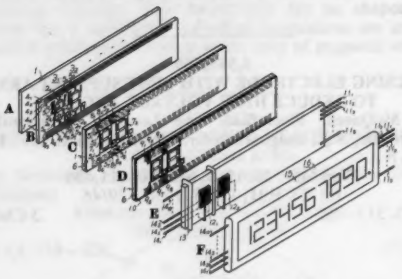
GASEOUS GLOW INDICATOR TUBE FORMED ON A SUBSTRATE WITH A PLURALITY OF INSULATING LAYERS

Saburo Uemura, and Yuzuru Yanagisawa, Kanagawa-ken, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed July 1, 1968, Ser. No. 741,668
Claims priority, application Japan, July 7, 1967, 42/43782
Int. Cl. H01j *61/66;* **H01k** *7/04*
U.S. Cl. 313—109.5 **6 Claims**

A gaseous glow indicator tube including method of manufacturing and aging in which the elements of the indicator

electrodes are arranged in a single plane by plating conducting segments on a base insulating plate which also carries a plurality of element energizing electrodes. The various elements of the indicator elements are individually connected to the energizing electrodes by strip conductors which are



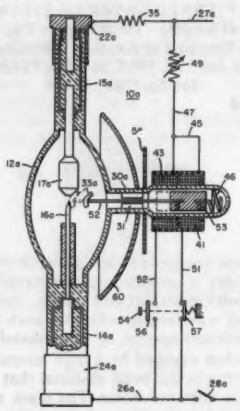
mounted on a layer of insulation which overlies the energizing electrodes. Anode electrodes are mounted adjacent the indicator electrodes and are connected to anode energizing leads so as to selectively energize various indications. A method for aging the gaseous glow indicator is also disclosed.

3,588,572

SHORT-ARC ELECTRIC DISCHARGE LAMP HAVING AN ARC-IGNITOR ASSEMBLY THAT IS MOVABLY MOUNTED WITHIN AN INTEGRAL PART OF THE LAMP ENVELOPE

Norman C. Beese, Verona, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 17, 1968, Ser. No. 768,453
Int. Cl. H01j *7/36, 61/54*
U.S. Cl. 313—146 **8 Claims**



A short-arc discharge lamp is started on its operating voltage supply by an arc-ignitor assembly that is movably mounted within a sealed laterally-extending hollow arm provided on the envelope and, when actuated, bridges the discharge gap between the electrodes and is then withdrawn from such position. In one embodiment the ignitor assembly comprises a mechanically actuated lever that is pivotally mounted in the envelope arm and is movably sealed thereto by a sylphon bellows. In another embodiment the ignitor assembly is reciprocally movable within the sealed envelope arm and includes an iron armature that is magnetically actuated by an exterior electromagnet mounted on the arm.

3,588,573

ALUMINA-RARE EARTH OXIDE CERAMIC TO METAL SEALS FOR CONTAINING HIGH TEMPERATURE VAPORS

Cheng-Lin Chen; Robert J. Zollweg, Monroeville, Pa., and Dietrich F. Ennulat, Elmira Heights, N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 29, 1967, Ser. No. 694,675
Int. Cl. H01j *61/00, 61/36*
U.S. Cl. 313—221 **6 Claims**

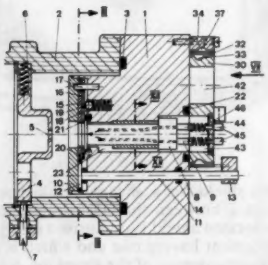
A family of sealing compositions for sealing refractory metal end closure members to tubular polycrystalline alumina envelopes. The sealing compositions comprise a mixture of aluminum oxide and one or more rare-earth oxides selected from the group consisting of yttrium oxide, neodymium oxide, samarium oxide, gadolinium oxide, europium oxide, dysprosium oxide, praseodymium oxide, terbium oxide, holmium oxide, erbium oxide, thulium oxide, ytterbium oxide, and lutetium oxide in nearly eutectic proportions.

3,588,574

CATHODE-RAY DEVICE WITH A REPLACEABLE CATHODE

Heinrich Hogg, Otelfingen/Zurich, Switzerland, assignor to Eidophor A.G., Glarus, Switzerland

Filed May 8, 1969, Ser. No. 822,922
Claims priority, application Sweden, May 15, 1968, 7174/68
Int. Cl. H01j *1/00*
U.S. Cl. 313—237 **13 Claims**



A cathode-ray device has an electron-gun system with a replaceable cathode. The cathode is housed in a space in the base of the device. The space has a forward opening into the body of the device for the passage of electrons and a rear opening allowing withdrawal of the cathode. A vacuum lock is provided by respective closures at the front and rear openings, the operating mechanisms for the closures being interlocked to prevent one closure being opened unless the other is securely closed. Each closure has a plate engaging a sealing ring disposed about the associated opening, the plate being moved linearly away from the sealing ring prior to being turned to align an aperture in the plate with the associated opening. Closure is effected by a reverse sequence.

3,588,575

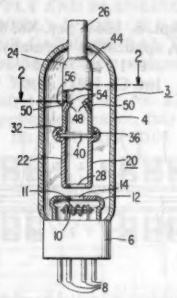
HIGH VOLTAGE ELECTRON DISCHARGE TUBE

Clifford Mandeville Morris, Somerville, N.J., assignor to RCA Corporation

Filed June 30, 1969, Ser. No. 837,561
Int. Cl. H01j *19/42*
U.S. Cl. 313—238 **5 Claims**

A high voltage electron tube, such as type 6BK4, has a cathode and a tubular anode having an electron target

therewithin. A port is provided through the anode wall to facilitate outgassing of the anode. A portion of the anode wall adjacent to the port extends inwardly of the anode into the path of X-radiations from the target to the port.

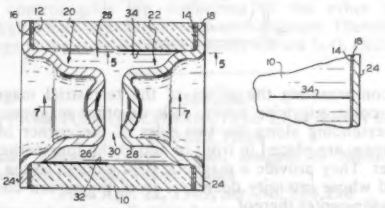


3,588,576

SPARK-GAP DEVICE HAVING A THIN CONDUCTIVE LAYER FOR STABILIZING OPERATION

Chester J. Kawiecki, Santa Barbara, Calif., assignor to Joslyn Mfg. and Supply Co., Chicago, Ill.

Filed Nov. 25, 1968, Ser. No. 778,544
Int. Cl. H01j *1/46, 21/10*
U.S. Cl. 313—306 **20 Claims**



A spark-gap device includes first and second electrodes and an insulating spacer separating the two. Along the insulating spacer is disposed an elongate conductive layer in intimate contact with the spacer and electrically connected to a first of the electrodes. The conductive layer, which is narrow compared to the active part of the electrodes where arcing takes place, extends from the first electrode toward the second, but is spaced from the second by a distance greater than the gap spacing between the electrodes.

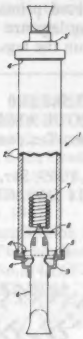
3,588,577

CALCIA ALUMINA MAGNESIA BARIA SEAL COMPOSITION

Charles I. McVey, Shaker Heights, and William C. Louden, South Euclid, Ohio, assignors to General Electric Company

Filed Mar. 17, 1969, Ser. No. 807,873
Int. Cl. H01j *5/00*
U.S. Cl. 313—317 **6 Claims**

An improved seal or bond between a refractory metal and a translucent alumina ceramic body uses a glassy sealing composition centered on 36.4 weight percent CaO, 45.0 weight percent Al_2O_3, 4.7 weight percent MgO, and 13.9 weight percent BaO. This composition permits a lower sealing temperature (1410° C.), and a wider range (± 50° C.) in sealing temperature without deleterious effects, than previously known compositions.

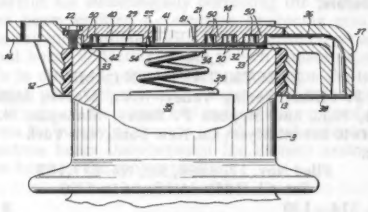


3,588,578

LIGHTNING ARRESTER VENTING MEANS

Charles R. Clinkenbeard, Cudahy, Wis., assignor to McGraw-Edison Company, Milwaukee, Wis.

Continuation of application Ser. No. 766,752, Oct. 11, 1968, now abandoned. This application May 22, 1970, Ser. No. 41,674
Int. Cl. H01k *1/52*
U.S. Cl. 313—325 **3 Claims**



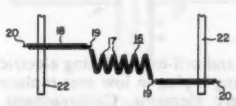
A lightning arrester having its ends sealed by vent diaphragms of a composite construction arranged to provide uniform diaphragm bursting pressures. The lightning arrester further comprises an end cap structure including labyrinth means to prevent clogging of the vents by parts expelled from the interior of the arrester during the failure of an arrester to thereby prevent excessive pressure buildup in the interior of the arrester.

3,588,579

ELECTRIC LAMP FILAMENT HAVING A COILED-COIL BODY PORTION WITH ORIENTED OFFSET LEGS, AND METHOD OF MANUFACTURE

Jacob F. Michael, Paramus, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 23, 1967, Ser. No. 648,430
Int. Cl. H01j *1/16, 19/10;* **H01k** *1/14*
U.S. Cl. 313—344 **7 Claims**



A coiled-coil filament of refractory metal wire having longitudinally depending legs at each end that are joined to the

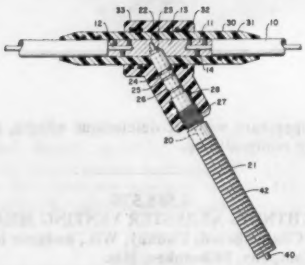
coil barrel by open primary turns which are bent through predetermined angles. The primary winding is formed as a continuous coil and, after the second coiling operation has been completed and the primary and secondary mandrels have been removed, selected primary turns in each of the then transversely extending legs are bent around an abutting stationary anvil to reposition the legs.

3,588,580

ELECTRODE ASSEMBLY

Thomas F. Vining, Houston, Tex., assignor to Shell Oil Company, New York, N.Y.

Filed Sept. 11, 1969, Ser. No. 857,015
Int. Cl. G01v *1/06*; G10k *10/00*
U.S. Cl. 314—130 **5 Claims**



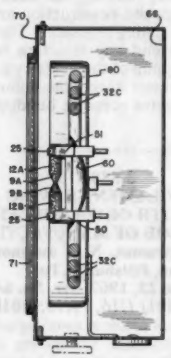
An electrode assembly for use with spark discharge devices of the type used for marine seismic surveys wherein a plurality of electrodes project from a conductor cable with each electrode being covered with an insulator formed from a series of wafers.

3,588,581

ELECTRIC ARC SUN LAMP

Robert P. Miller, Spring Valley, N.Y.; Marvin Miller, Teaneck, N.J., and Stephen P. Bailey, Mahopac, N.Y., assignors to Bristol-Myers Co. New York, New York Conn.

Filed Nov. 17, 1969, Ser. No. 877,182
Int. Cl. H05b *31/18*; A61n *5/00*
U.S. Cl. 314—130 **8 Claims**



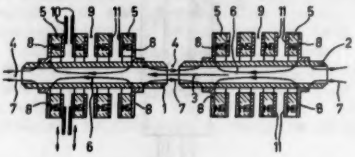
A self-starting and self-extinguishing electric arc sun lamp is provided utilizing a plug-in low cost replaceable cartridge holder for the arc elements. Carbonaceous arc elements comprising a compressed homogeneous mixture of powdered carbon and powdered metal are utilized to enhance ultraviolet radiation in the tanning range so as to provide optimum tanning exposure and minimum skin burning effect.

3,588,582

MAGNET SYSTEM FOR FOCUSING THE ELECTRON BEAM IN A HIGH-POWER KLYSTRON

Vladimir Dubravec, Rellingen, and Kurt Hirsch, Hamburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 8, 1969, Ser. No. 855,803
Claims priority, application Germany, Sept. 7, 1968, P 17 91 080.4
Int. Cl. H01j *23/08*
U.S. Cl. 315—5.35 **6 Claims**



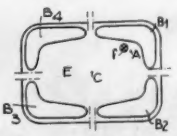
A system for providing a spatial periodic magnetic field for focusing the electron beam of a high-power klystron by arranging a number of annular magnetic rings having axial magnetization in the same sense coaxially around the drift tubes between resonant cavities.

3,588,583

MAGNETIC ELEMENTS MOUNTED ON THE CORNERS OF THE SCREEN OF COLOR TELEVISION TUBES FOR COMPENSATING FOR THE EFFECT OF THE TERRESTRIAL MAGNETIC FIELD

Jean Ciecierski, Paris, France, assignor to Thomson-CSF

Filed June 27, 1969, Ser. No. 837,288
Claims priority, application France, July 16, 1968, 159,318
Int. Cl. H01f *13/00*; H01j *29/06*
U.S. Cl. 315—8 **5 Claims**



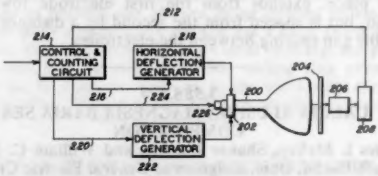
For compensating the effect of the terrestrial magnetic field in color television tubes, coils or other magnetic elements, extending along the two sides of the corner of the tube screen, are placed in front of and at the four corners of the latter. They provide a magnetic field parallel to the tube axis and whose intensity decreases from the screen corners towards the center thereof.

3,588,584

APPARATUS FOR POSITIONING A LIGHT SPOT ONTO A CHARACTER MASK

Matthew P. Tubinis, Penfield, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed July 29, 1968, Ser. No. 748,367
Int. Cl. G01j *1/20*; G11c *11/26*; H01j *31/26*
U.S. Cl. 315—10 **13 Claims**



An electrooptical character display and recording device which includes a digital control system for accurately positioning a light beam from a cathode-ray tube onto a symbol contained on a mask, said mask also including a plurality of reference marks along the horizontal and vertical edges thereof, the number of marks traversed by said beam along

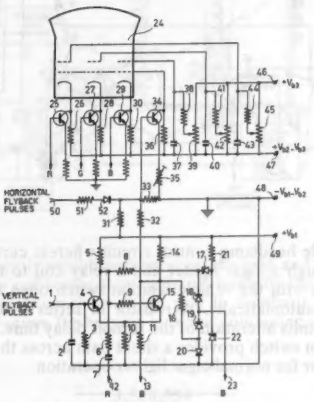
its scan path representing the beam position on the mask and means for recording said symbol.

3,588,585

COMBINED SUPPLY AND BLANKING CIRCUIT FOR ELIMINATING SUPPLY VOLTAGE VARIATIONS OF A COLOR CATHODE-RAY TUBE

Marcel Rognon, Houilles, France, assignor to U. S. Philips Corporation, New York, N.Y.

Filed July 1, 1969, Ser. No. 838,214
Claims priority, application France, July 4, 1968, 157806
Int. Cl. H01j *29/50*
U.S. Cl. 315—13 **7 Claims**



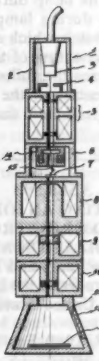
A circuit for eliminating the effects of supply voltage variations on a cathode-ray tube. The cathodes and control grids are connected to one terminal of an unstabilized power supply through low value resistors. In addition, the cathodes and control grids are connected to the other terminal through a high impedance, such as transistors. Therefore, any change in the supply voltage equally effects both electrodes.

3,588,586

APPARATUS FOR CORRECTING ELECTRON BEAM DEFLECTION

Takashi Yanaka, Tokyo, Japan, assignor to Nihon Denshi Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 22, 1969, Ser. No. 818,298
Claims priority, application Japan, Apr. 26, 1968, 43-28060
Int. Cl. H01j *29/70*
U.S. Cl. 315—18 **9 Claims**



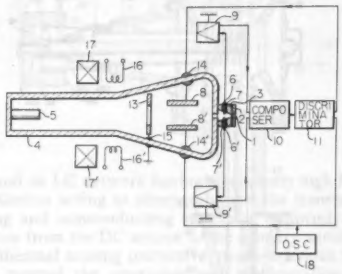
An apparatus for correcting electron beam deflection in electron microscopes caused by asymmetrical leakage flux comprising a small magnetic circuit which generates a magnetic field opposite to the deflecting component of said leakage flux, the magnetic circuit being small as compared with the magnetic circuits of the electron lens, being made of the same material as the lenses and being energized by a current proportional to the current energizing the magnetic circuits of the lenses.

3,588,587

CATHODE-RAY TUBE

Yoshihiro Uno, Machida-shi, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Claims priorities, Japan, 42/65874, Oct. 11, 1967; 42/66218, Oct. 12, 1967; 42/66758, Oct. 13, 1967; 42/67001, Oct. 14, 1967; 42/67083, Oct. 16, 1967
Continuation-in-part of application Ser. No. 765,365, Oct. 7, 1968, now abandoned. This application July 22, 1969, Ser. No. 843,692
Int. Cl. H01j *29/70*
U.S. Cl. 315—21 **6 Claims**



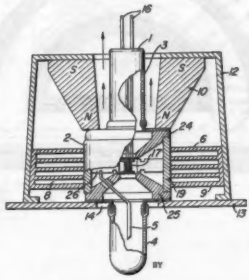
Apparatus for automatically correcting the position of an electron beam emitted by electron producing means in a cathode-ray tube equipped with a line-shaped target and conventional beam deflecting means, which apparatus makes it possible to direct the electron beam exactly on the target by providing a pair of electrodes for detecting the electron beam in the vicinity of the target and by providing pair of deflecting plates for supplying thereto an AC signal so as to wobble the electron beam therebetween for thereby restoring the electron beam to the proper position.

3,588,588

MAGNETRON DEVICE WITH EXITING PERMANENT MAGNET FREE FROM MAGNETIC SHORT-CIRCUITING BY FRAME

Tsuneo Numata, Kyoto, Japan, assignor to Matsushita Electronics Corporation, Osaka, Japan

Filed June 16, 1969, Ser. No. 833,253
Int. Cl. H01j *25/50*
U.S. Cl. 315—39.51 **10 Claims**



A magnetron device in which an upper insulator vessel including therein cathode lead members extending from a cathode contained, together with an anode, a cavity resonator and magnetic pole pieces, in a metal vessel is disposed in an axial hole in a cylindrical or conical permanent magnet

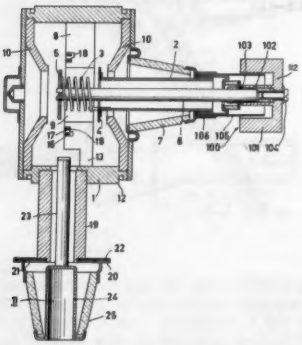
for exciting a magnetron with an interstice therebetween to define a ventilation flue for effectively cooling the upper insulator vessel and the permanent magnet to prevent the insulator vessel from breakage due to uneven heating of the insulator vessel by making the distribution of the temperature of the insulator vessel even.

3,588,589

MAGNETRON AND CONNECTION SYSTEM FOR MAGNETRON

Marinus Arnoldus Vonk, Emmasingel, Eindhoven, Netherlands, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Aug. 8, 1969, Ser. No. 848,506
Claims priority, application Netherlands, Aug. 17, 1968,
Int. Cl. H01j *25/50*
U.S. Cl. 315—39.53 **3 Claims**



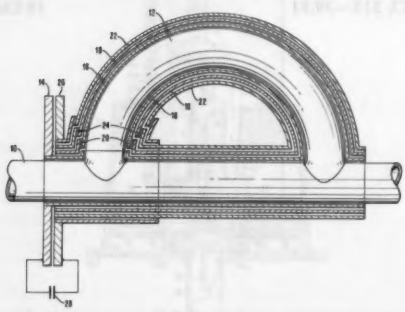
An electron discharge tube with a coaxial pair of cathode connections. The cathode voltage is supplied by means of a connection arrangement comprising a clamping pipe and a plug that is so constructed as to minimize leakage of microwave radiation.

3,588,590

GAS DISCHARGE PLASMA TUBE HAVING A MULTITURN PRIMARY WINDING

Charles B. Zarowin, Bronx, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 7, 1969, Ser. No. 814,088
Int. Cl. H01j *7/44, 65/00;* **H01s** *3/09*
U.S. Cl. 315—57 **5 Claims**



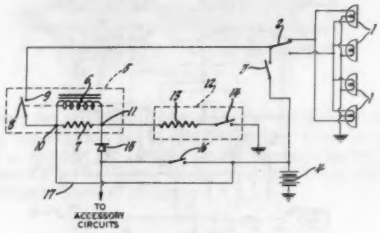
A plasma tube containing a gas which is excited by means of a multiturn coaxial primary winding is described. The tube is topologically toroidal in shape and is filled with the gas. The tube is surrounded by a series of conductive layers, for example, layers of copper, which are separated from each other by insulation. The conductive layers are connected together to form a coaxial series multiturn winding which is used as a primary winding to excite the gas in the tube.

3,588,591

AUTOMOBILE HEADLIGHT SYSTEM INCLUDING TIME DELAY CIRCUIT OF CIGAR LIGHTER

John R. Harris, and Gerald E. Rigsby, Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 11, 1969, Ser. No. 884,152
Int. Cl. B60q *1/02*
U.S. Cl. 315—77 **2 Claims**



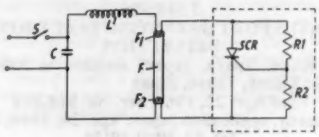
A vehicle headlamp control circuit wherein current is supplied through a cigar lighter and a relay coil to turn on the headlamps with the vehicle ignition switch open and to turn them off automatically. A resistor in series with the cigar lighter permits alteration of the turnoff delay time. Closure of the ignition switch provides a shunt path across the relay coil and resistor for normal cigar lighter operation.

3,588,592

STARTER FOR FLUORESCENT LAMPS

Isaac Joseph Brandstadter, Jerusalem, Israel, assignor to Yissum Research Development Company, Hebrew University, Jerusalem, Israel

Filed Jan. 27, 1969, Ser. No. 794,120
Claims priority, application Israel, Jan. 29, 1968, 29382
Int. Cl. H05b *41/02, 41/16*
U.S. Cl. 315—99 **10 Claims**



A starter for the kind of fluorescent lamp which is used in a circuit energized from an AC source and which causes a high AC voltage across the lamp during starting and a lower voltage across the lamp during lamp operation, the starter being a semiconductor switch which during alternate half-cycles of the supply causes heating of the filaments and during the other half-cycles causes the full supply voltage to be applied to the lamp, the heating of the lamp filaments ceasing when the lamp is energized and the lamp voltage thereby falls.

3,588,593

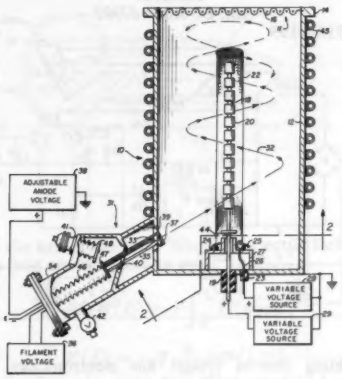
METHOD OF OPERATING AN ION-GETTER VACUUM PUMP WITH GUN AND GRID STRUCTURE ARRANGED FOR OPTIMUM IONIZATION AND SUBLIMATION

Mario Rabinowitz, Menlo Park, and Edward L. Garwin, Los Altos Hills, Calif., assignors to the United States of America as represented by the United States Atomic Energy Commission

Filed Mar. 27, 1969, Ser. No. 811,028
Int. Cl. H01j *7/16, 17/22*
U.S. Cl. 315—108 **8 Claims**

Electrons injected between a cylindrical housing and a coaxial cylindrical grid at a predetermined angular momen-

tum spiral over long paths around the grid for optimum ionization of gas molecules. A first electrostatic field is established between the housing and grid for accelerating ions to the housing and for establishing an optimum kinetic energy of the orbiting electrons. A second electrostatic field



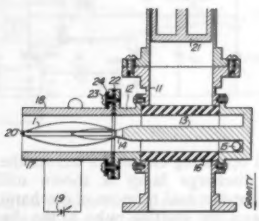
is independently established between the grid and a concentric titanium rod anode at an optimum intensity for accelerating spent electrons through the grid to bombard and sublimate the titanium for burying ions and combining with active gases.

3,588,594

DEVICE FOR BENDING A PLASMA FLAME

Manabu Yamamoto, Odawara-shi; Seiichi Murayama, and Hiromitsu Matsuno, Hachioji-shi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 15, 1969, Ser. No. 791,433
Claims priority, application Japan, Jan. 19, 1968, 43/2629
Int. Cl. H01j *7/24*
U.S. Cl. 315—111 **10 Claims**



A plasma flame generator is used as an excitation source for spectroscopic analysis, that is, a plasma flame generator having a device for bending a plasma flame, in which a pair of auxiliary electrodes are disposed so as to encircle the plasma flame along the central axis of the plasma flame and a DC voltage is applied to said auxiliary electrodes for utilizing the drift of ions along the electric lines of force to bend the plasma flame in a predetermined direction.

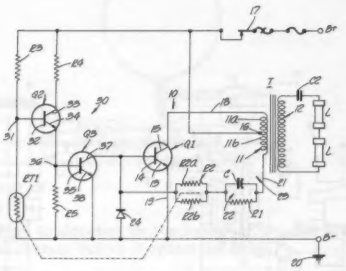
3,588,595

FLUORESCENT LAMP BALLAST AND THERMAL PROTECTIVE MEANS THEREFOR

Jerry J. Silvers, Los Angeles, Calif., assignor to Walter Kidde & Company, Inc., Clifton, N.J.

Continuation-in-part of application Ser. No. 682,380, Nov. 13, 1967. This application Nov. 26, 1969, Ser. No. 880,213
Int. Cl. H05b *37/00*
U.S. Cl. 315—127 **7 Claims**

Ballast control for electron discharge tubes, such as fluorescent lamps, in which the lamps are connected to the secondary of a transformer having a primary winding incorporating blocking oscillator means in which a single transistor has its output circuit connected through one portion of the primary winding to the terminals of a DC source, and its input circuit connected through another portion of the transformer primary winding to the terminals of the DC source, the input circuit being provided with resistor means and capacitor means which coact with the primary winding portion of the input circuit in a manner to effect a tuned RC



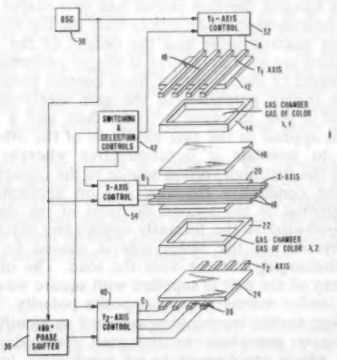
network and an LC network having a relatively high frequency of oscillation acting to alternately bias the transistor into conducting and nonconducting states for uniformly pulsing current flow from the DC source to the primary winding, and in which thermal sensing protective means operates to automatically control the operation and nonoperation of the oscillator means and prevent the ballast from reaching dangerously high temperatures which could result in the creation of equipment hazards.

3,588,596

TWO-COLOR MATRIX-TYPE DISPLAY PANEL

Donald D. Tech, Rhinebeck, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 1, 1968, Ser. No. 772,786
Int. Cl. H01j *11/02, 11/04*
U.S. Cl. 315—169 **11 Claims**



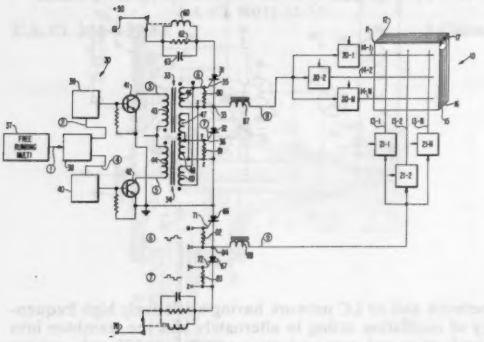
A plasma display apparatus in which a color display is achieved by sandwiching different gases between X and Y matrix conductors. The gases are chosen such that each gas gives off a different color when ionized.

3,588,597

HIGH POWER SQUARE WAVE SUSTAINING GENERATOR FOR CAPACITIVE LOAD GAS DISCHARGE PANELS

Ellsworth M. Murley, Jr., Toledo, Ohio, assignor to Owens-Illinois, Inc., Ohio

Filed July 31, 1969, Ser. No. 846,555
Int. Cl. H05b *41/24*
U.S. Cl. 315—169 **11 Claims**



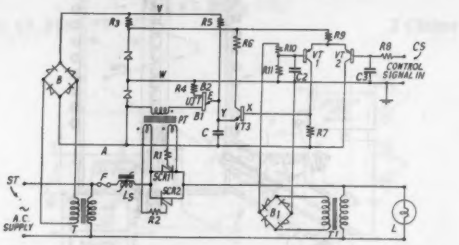
There is disclosed a high power square wave sustaining generator system for a gas discharge panel particularly of the type in which discharge sites in a thin gaseous discharge medium confined in a space between a pair of dielectric charge storage members are defined by a pair of matrix conductor arrays. Thyristor pairs are series connected across a high direct current voltage potential source with an intermediate point between the thyristor pair being connected to conductors of one of the arrays. A second thyristor pair is series connected across a second source of high voltage direct current potential of opposite polarity to that of the first source. A free-running multivibrator operating at double the desired frequency of output of square waves has its output divided by a bistable flip-flop circuit and two output voltages (each the complement of the other) from the flip-flop are fed to one-shot multivibrators and the output of the one-shot multivibrators are used as control or trigger potentials for the gate electrodes of the thyristors. Such control potentials are applied as trigger potentials to the gate electrode of one thyristor of a pair to cause it to conduct and a blocking potential is applied to the gate electrode of the other of the thyristors to maintain it nonconductive whereby current flows from the first high voltage source to the capacitive load through the conductive thyristor and on application of a trigger potential to the second thyristor of the pair and a blocking potential to the formerly conducting thyristor, the second thyristor of the series pair is caused to conduct thereby discharging current from the load. The other conductor array of the pair is supplied with square wave potentials in a similar manner but of opposite polarity. Transformers having double secondaries are used to simultaneously supply trigger potentials to the gate electrodes of the thyristors which are desired to be conductive to thereby supply charging current to the panel and a blocking potential to the gate electrode of the other thyristors to render them nonconductive. A protection circuit is also provided in the event both thyristors of a series pair are rendered conductive at the same time. In addition, there is disclosed a series lossy inductor in the circuit to the conductor arrays to limit peak current and ringing currents to the load. Consult the specification for other features and details.

3,588,598

LIGHTING-CONTROL SYSTEMS

Anthony L. Isaacs, London, England, assignor to Thorn Electrical Industries Limited,, London, England

Filed Jan. 2, 1968, Ser. No. 695,202
Claims priority, application Great Britain, May 15, 1967, 22535/67
Int. Cl. H05b *37/02*
U.S. Cl. 315—199 **4 Claims**



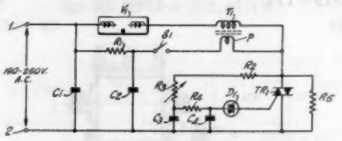
A lighting control system has electronically triggered switching devices controlling the current supply to a lighting load and a feedback circuit for modifying the control characteristics of the switching devices in dependence on the mean value in any half cycle of the voltage between the load terminals.

3,588,599

ELECTRIC SYSTEM FOR STARTING AND OPERATING A GAS DISCHARGE LAMP

Maksymilian A. Michalski, Woodside, N.Y., assignor to Berkey Photo, Inc., New York, N.Y.

Filed June 16, 1969, Ser. No. 833,534
Int. Cl. H05b *37/00*
U.S. Cl. 315—200 **8 Claims**



A starting and operating circuit for across the line operation of a gas discharge lamp is shown utilizing single switching means for the dual purpose of discharging a capacitor to apply at least one starting pulse to the discharge lamp and for switching the lamp for pulsed operation.

3,588,600

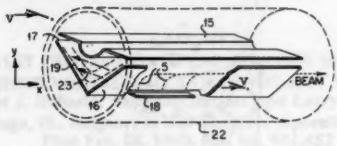
NONUNIFORM CROSSED FIELD ELECTRON GUN FOR PRODUCING A STABLE ELECTRON BEAM ORBIT

Norihiko Nakayama, Kobe-shi; Minoru Tanaka, Takasago-shi, and Eizo Miyauchi, Kawanishi-shi, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Oct. 14, 1969, Ser. No. 866,202
Claims priority, application Japan, Oct. 15, 1968, 43-75175
Int. Cl. H01j *11/04, 13/48*
U.S. Cl. 315—326 **7 Claims**

A nonuniform crossed field electron gun has a long thin anode parallel to the axis of the tube and a cathode spaced from the anode by a constant interval and opposite the anode. An electrode of dihedral configuration has a vertex with an elongated aperture formed therein in the center area of the vertex. The cathode is positioned in the aperture and the electrode opens toward the anode. An electric field E(y) is produced in the area between the anode and the electrode to provide movement of electrons in axial direction of the tube. A magnetic field B(y) is produced which has a strength

which varies as a function of the distance y from the cathode to the anode in a direction transverse to that of the electric



field and the axis of the tube. When the electric field and the magnetic field are in a position $y=L$,

$$2L[B(L)]=P\int_0^L B(y)dy$$

$$E(L)=\frac{-2\cdot\frac{e}{m}\cdot[B^2(L)]L}{P}$$

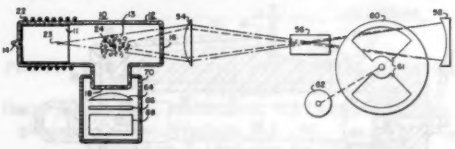
wherein L is the position of the stable orbit of electrons between the cathode and anode, d is the charge of electrons, m is the mass of electrons and P is a constant.

3,588,601

RADIO FREQUENCY SPECTRAL EMISSION AND DETECTOR DEVICE

George K. Yamasaki, Horseheads, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 27, 1968, Ser. No. 787,389
Int. Cl. G01j *3/12;* **H05b** *41/24*
U.S. Cl. 315—344 **4 Claims**



This invention relates to a spectral emission and detection device which includes an envelope filled with an inert gas capable of sustaining a discharge under application of radio frequency power. The envelope also includes a metal or metals in a pure state or a chemical compound to produce sharp spectral lines of the atomic spectra of the metal enclosed. The device is capable of emission of light of wavelengths characteristic of the material as well as generation of ground state atoms subject to absorption of radiation and emission of radiant energy at the same or higher wavelength.

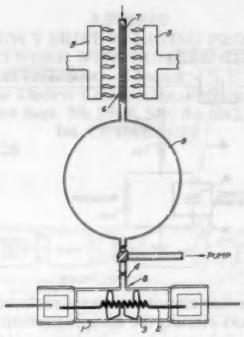
3,588,602

METHOD OF INTRODUCING HALOGENS INTO ELECTRIC LAMPS

Theo Berlinghof, Landershofen, Germany, assignor to Patent-Treuhand-Gesellschaft Fur elektrische Gluhlampen mbH

Filed Apr. 2, 1969, Ser. No. 812,629
Claims priority, application Germany, Apr. 26, 1968, P 17 64 229.4
Int. Cl. H01j *9/20*
U.S. Cl. 316—7 **6 Claims**

In the process of introducing a halogen into a lamp in the form of a halogenated hydrocarbon, the feed conduit or exhaust tube is heated at a localized area to a temperature sufficiently high to decompose the hydrocarbon and precipitate the carbon thereat before it enters the lamp.

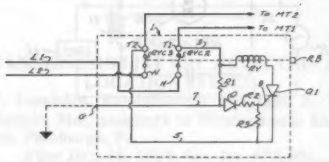


3,588,603

PROTECTIVE APPARATUS

Thomas E. Slugantz, Versailles, Ky., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 21, 1968, Ser. No. 777,586
Int. Cl. H02h *3/00*
U.S. Cl. 317—9 **10 Claims**



Protective apparatus for disconnecting a power load from its source of electrical power if there is an open ground connection or if the load is improperly connected to the power source. The apparatus includes a triggerable semiconductor current switching device, e.g., a triac or an SCR, and a relay responsive to operation of the device with contacts normally connecting the load to the power source. The apparatus is connected to the power load to detect an open ground connection or improperly polarized power connection thereby to trigger the current switching device and thus open the contacts to protectively disconnect the load from the power source.

This invention relates to apparatus for detecting a faulty grounding circuit or a faulty wiring connection of a load to a power source, and more particularly to such apparatus which will automatically disconnect the load from the power source if there is either an open ground connection or an improperly polarized connection of the load to the source.

3,588,604

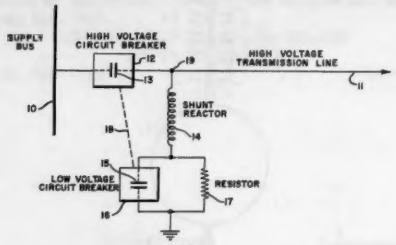
APPARATUS FOR REDUCING SWITCHING TRANSIENTS ON SHUNT COMPENSATED HIGH VOLTAGE TRANSMISSION LINES

Arthur Hauspurg, 717 Stuart Ave., Mamaroneck, N.Y.

Filed Oct. 14, 1968, Ser. No. 767,270
Int. Cl. H02h *7/22*
U.S. Cl. 317—11 **4 Claims**

A circuit breaker has contacts in series with a shunt compensating reactor, preferably on the ground side thereof, and a damping resistor is connected thereacross. The circuit breaker is interconnected with the line circuit breaker so as

to introduce the resistor in series with the reactor when the line circuit breaker opens and thereby damp transient oscillations. When the line circuit breaker is reclosed, the other circuit breaker short-circuits the damping resistor.

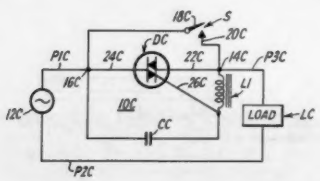


3,588,605

ALTERNATING CURRENT SWITCHING APPARATUS WITH IMPROVED ELECTRICAL CONTACT PROTECTION AND ALTERNATING CURRENT LOAD CIRCUITS EMBODYING SAME

Charles F. Casson, Winslow, Ind., assignor to AMF Incorporated

Filed Oct. 10, 1968, Ser. No. 766,504
Int. Cl. H02h *7/22*
U.S. Cl. 317—11 **8 Claims**



A switching apparatus for an alternating load circuit is provided with a bidirectional or bilateral semiconductor triode device of the thyristor type connected for conduction in shunt with the contacts of an electromechanical switch for arc suppression, and has a gate circuit comprised in whole or in part by reactive passive elements which exhibit impedance characteristics to render the solid state triode device conductive in response to arcing conditions at the switch contacts but which preclude such a response due to circuit transients. The solid state triode device is also substantially instantaneously responsive to relatively large dv/dt characteristics or extreme excesses (exceeding the breakover voltage of solid state device) of arcing voltage appearing across the switch contacts.

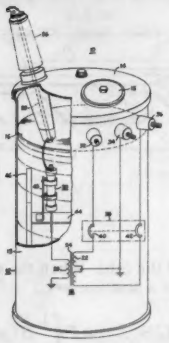
3,588,606

ELECTRICAL INDUCTIVE APPARATUS

Donald J. Ristuccia, Sharpsville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 1, 1968, Ser. No. 764,092
Int. Cl. H02h *7/04*
U.S. Cl. 317—15 **13 Claims**

Electrical inductive apparatus, including a casing filled to a predetermined level with liquid dielectric means, a magnetic core-winding assembly disposed within the casing and immersed in the liquid dielectric means, a plurality of insulating bushings disposed to introduce electrical conductors into the casing through openings therein, and at least one fuse assembly. The fuse assembly is disposed within the casing, below the level of the liquid dielectric, and is conductively interconnected between the electrical conductor of an insulating bushing, and one of the windings of the magnetic core-winding assembly. The fuse assembly includes a sealed fuse tube having a pair of electrically conductive terminal elements at its ends, a solid liner of arc extinction material of the type which emits water vapor, or other condensable gas, when subjected to the heat of an arc, an arcing passageway between the ends of the fuse tube, and a fusible element disposed in the arcing passageway, conductively interconnecting the pair of terminal elements.

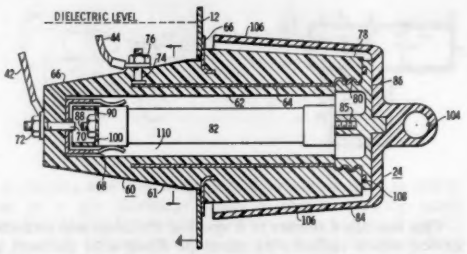


3,588,607

ELECTRICAL TRANSFORMER APPARATUS FOR GROUND LEVEL INSTALLATION HAVING FUSED MEANS ACCESSIBLE FROM OUTSIDE THE APPARATUS

Donald J. Ristuccia, Sharpsville, Pa., and Kenneth R. Klein, Niles, Ohio, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 24, 1969, Ser. No. 860,672
Int. Cl. H02h *7/04;* **H01h** *85/02*
U.S. Cl. 317—15 **6 Claims**



Electrical conductive apparatus such as a transformer adapted for mounting at ground level, including a casing filled to a predetermined level with liquid dielectric, a magnetic core-winding assembly disposed within said casing, protective fuse means disposed through one wall of said casing, and at least one high voltage bushing assembly disposed through one wall of the casing. The high voltage bushing is electrically connected in series circuit relationship with the protective fuse means and the fuse means is electrically connected in series circuit relationship with the high voltage windings of the winding assembly. The protective fuse means includes a longitudinal tubular receptacle having a longitudinal opening therein. The tubular receptacle extends through a wall of the casing with one end located inside the casing and with the other end extending outside of the casing. The protective fuse means also includes a removable fuse accessible from the end of the fuse assembly located outside the casing. The end of the fuse assembly extending inside the casing is closed to prevent liquid dielectric from

entering the longitudinal opening in the fuse receptacle. The end of the fuse receptacle positioned outside of the casing is closed by a weathertight closure. A current limiting fuse is attached to the weathertight closure member and is removed or inserted into the longitudinal opening in the fused receptacle by means of the weathertight closure member.

3,588,608

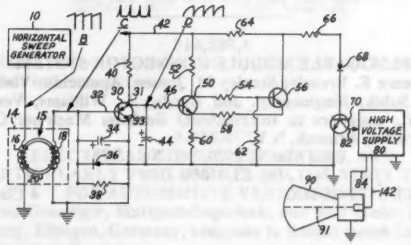
CIRCUIT PROTECTION APPARATUS FOR DISABLING HIGH VOLTAGE TO A CATHODE-RAY TUBE

Michael J. Halinski, Arlington Heights, and Larry Wanschek, Chicago, Ill., assignors to Sun Electric Corporation

Filed Feb. 24, 1969, Ser. No. 801,452

Int. Cl. H02h *7/00*

U.S. Cl. 317—31 **9 Claims**



The cathode-ray tube of an oscilloscope can be protected when the horizontal sweep generator thereof fails to produce an output signal by providing a capacitor that is periodically discharged through a controlled rectifier in response to signals received from the horizontal sweep generator. If the horizontal sweep generator fails to produce an output signal, the controlled rectifier is not operated and the capacitor charges to a voltage sufficient to activate a switch device. The switch device, in turn, disables the high voltage power supply that operates the cathode-ray tube.

3,588,609

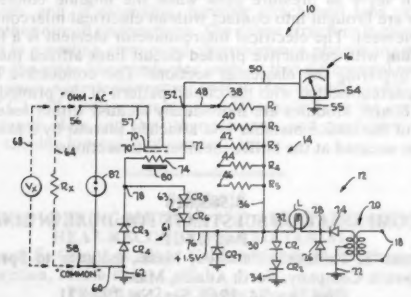
PROTECTOR CIRCUIT FOR ELECTRICAL MEASURING SYSTEM

Harry Joseph Keen, Middletown, N.J., assignor to Buck Engineering Co., Inc., Freehold, N.J.

Filed Aug. 7, 1968, Ser. No. 750,982

Int. Cl. H02h *3/20;* **G01r** *1/36*

U.S. Cl. 317—31 **8 Claims**



A temperature sensitive switch means is provided in series circuit path between an input terminal and means of a resistance measuring apparatus for disconnecting the resistance means from said input terminal upon the connection thereto of an excessive voltage source.

3,588,610

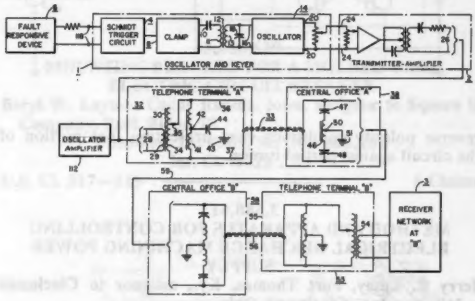
FREQUENCY SHIFT RELAYING PROTECTIVE NETWORK WITH NOISE CONTROL

Nicolas L. Perez-Stable, Chelsea, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 30, 1969, Ser. No. 862,397

Int. Cl. H02h *3/28*

U.S. Cl. 317—28 **9 Claims**



A frequency shift operated relaying system having means for preventing tripping in the presence of noise and in which means is also provided to permit tripping in the presence of noise when the trip frequency is maintained for a minimum interval indicative of the existence of a fault condition.

3,588,611

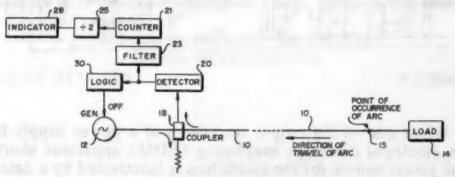
TRANSMISSION LINE ARC DETECTION AND LOCATION SYSTEM

Joseph F. Lambden, Randallstown, and John E. Thompson, Glen Burnie, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 31, 1969, Ser. No. 872,894

Int. Cl. H02h *3/20;* **G01r** *31/08*

U.S. Cl. 317—31 **11 Claims**



Detection of an arc along a transmission line and location of the point along the line at which the arc was ignited is achieved by detecting and counting peaks of the standing wave that moves with, and precedes, the arc as the arc travels backward toward the source of power carried by the transmission line.

3,588,612

SOLID STATE LAMP FLASHER

Douglas B. Leathem, Wayland; Raymond A. Jones, Saugus, and Walter F. Pope, Cambridge, Mass., assignors to United-Carr Incorporated, Boston, Mass.

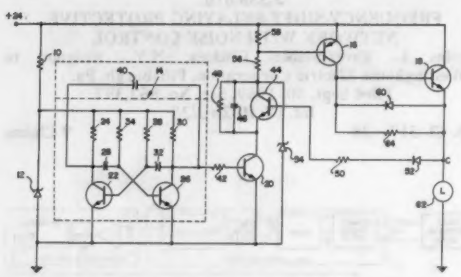
Filed June 12, 1968, Ser. No. 736,451

Int. Cl. H02h *9/02, 9/04*

U.S. Cl. 317—33R **2 Claims**

This is a solid state lamp flasher circuit which has diode and transistor means as a short circuit protection and also protects the power stage of the circuit from excessive

transient voltages by using a diode to turn the power stage on. A diode is also used to turn the power stage on where



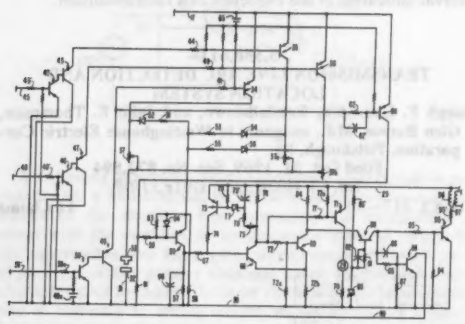
reverse polarity conditions exist protecting that portion of the circuit against partial turnon.

3,588,613

METHOD AND APPARATUS FOR CONTROLLING ELECTRICAL DISCHARGE MACHINING POWER SUPPLY

Jerry E. Losey, Fort Thomas, Ky., assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Apr. 14, 1969, Ser. No. 815,892
Int. Cl. H02h 7/12
U.S. Cl. 317—33 **10 Claims**



When one of the output transistors of a power supply for an electrical discharge machining (EDM) apparatus shorts, the power source for the transistors is inactivated by a detection circuit. A control, which turns the output transistors on and off, also is turned off when one of the output transistors shorts to prevent any further pulses to the transistors which are not shorted. The detection circuit also may include means to short the power source before the power source is inactivated.

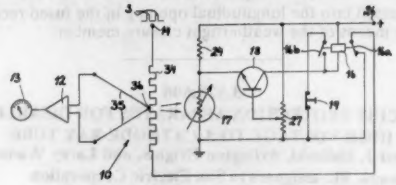
3,588,614

PROTECTIVE SYSTEM FOR THERMAL TRANSDUCER

Karl-Heinz Heidenreich, Neuhausen Erms, and Friedrich Neuscheler, Walddorf ub Tubingen, Germany, assignors to Wandel & Goltermann, Reutlingen, Germany

Filed Sept. 3, 1968, Ser. No. 756,878
Claims priority, application Germany, Aug. 31, 1967, P 16 48 325.3
Int. Cl. H02h 9/02
U.S. Cl. 317—41 **7 Claims**

The heater of a thermal transducer is connected in series with a circuit breaker controlled by a protective relay which operates, upon the temperature of the heater reaching a predetermined limit, in response to thermal radiation from the heater impinging upon a photoconductor or to electron



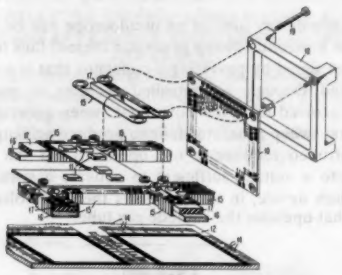
emission from a cathode forming part of or closely juxtaposed with the heater.

3,588,615

PLUGGABLE MODULE CONNECTOR SYSTEM

Lawrence E. Brearly; Stanley M. Jensen, Apalachin; Vincent P. Subik, Binghamton, and Gordon L. Williams, Vestal, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 2, 1970, Ser. No. 15,701
Int. Cl. H05k 1/04
U.S. Cl. 317—101CC **4 Claims**



A pluggable module connector assembly comprising a lattice member adapted for receiving and removably holding a plurality of circuit modules. The modules have contact areas along the peripheral edges to accommodate input/output signals, power and ground potentials. The lattice member is registered and attached to a printed circuit board and has molded elastomer sections secured to the lattice channels which serve as pressure pads when the module connector leads are brought into contact with an electrical interconnector element. The electrical interconnector element is a flexible film with conductive printed circuit lines affixed thereto and overlying the elastomer sections. The conductive lines are interconnected with the circuit pattern of the printed circuit board. Modules are individually located within receptacles of the lattice member and attached thereto by a loading frame secured at the lattice member intersections.

3,588,616

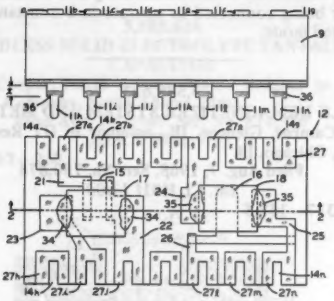
COMPENSATION SUBSTRATE FOR DUAL IN LINE PACKAGE

Norman S. Palazzini, Holliston, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Jan. 24, 1969, Ser. No. 793,821
Int. Cl. H05k 1/04
U.S. Cl. 317—101 **5 Claims**

A substrate having components formed by thick film techniques on one surface is connected to a dual in line package in a manner which interconnects the components with the circuit within the package. The substrate is designed

to be wholly accommodated beneath the package with the package leads extending beneath the substrate making them



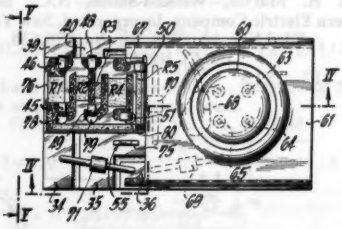
available for both insertion into a printed circuit board and further interconnection.

3,588,617

ELECTRICAL CIRCUIT STRUCTURE, AND PARTICULARLY VOLTAGE REGULATOR STRUCTURE FOR AUTOMOTIVE VEHICLE USE

Alfred Grozinger, Stuttgart-Degerloch, and Rolf Wohr, Leonberg, Eltingen, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Mar. 18, 1969, Ser. No. 808,198
Claims priority, application Germany, Apr. 11, 1968, P 17 63 157.1
Int. Cl. H05k *1/04*
U.S. Cl. 317—101 **7 Claims**



Semiconductor elements and passive electrical network elements are placed on interconnecting sheet metal conductor units which have holes punched therein to receive connecting leads, and extending tabs punched out, the tabs being bent over to hold a ceramic resistance substrate plate thereto, and, if extending, forming attachment tabs or lugs for other circuit connections. The entire structure is encapsulated in a potting compound, the resistance plate being parallel to the plate-like conductor units so that differential expansion upon wide temperature swings (for example −40° C to 110° C) will not transfer stresses differentially to the ceramic resistance plate and the other elements and conductor units thus causing loosening of connections.

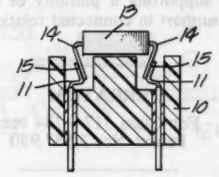
3,588,618

UNSOLDERING METHOD AND APPARATUS USING HEAT-RECOVERABLE MATERIALS

Richard F. Otte, Los Altos, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Mar. 2, 1970, Ser. No. 15,685
Int. Cl. H05k *1/18, 3/34*
U.S. Cl. 317—101CC **23 Claims**

Heat-recoverable material such as TiNi is used for the electrical leads of a member so that such leads when soldered to other leads may be disconnected therefrom by first physically deforming at least the TiNi leads and then heating the solder joint to melt the solder and cause the TiNi leads to "recover," that is, to move back to their initial position before deforming and thereby separate the TiNi leads from the other leads.

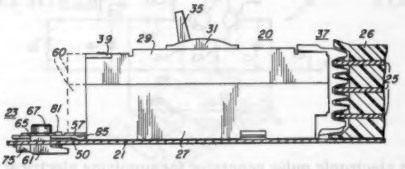


3,588,619

MOUNTING BRACKET FOR A MOLDED-CASE ELECTRIC CIRCUIT BREAKER

Beryl W. Layton, Cedar Rapids, Iowa, assignor to Square D Company, Park Ridge, Ill.

Filed Feb. 25, 1969, Ser. No. 802,102
Int. Cl. H02b *1/04*
U.S. Cl. 317—119 **6 Claims**



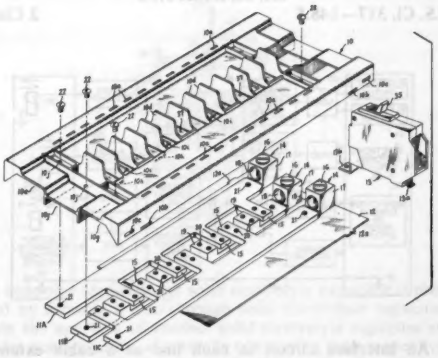
The bracket includes a rotatable cam means and is secured to one end portion of a circuit breaker having a set of plug-on terminal jaws at its other end portion. When the bracket and circuit breaker are placed on a mounting pan of an electrical panelboard, the cam means extends through a rectangular opening in the mounting pan in position to selectively engage opposite side edges of the opening upon rotation thereby to move the circuit breaker toward and away from a stack of bus bars on the pan.

3,588,620

ELECTRICAL CONTROL DEVICE PANEL ASSEMBLY WITH MULTIFUNCTIONAL INSULATING SUPPORT MEANS

Norbert J. Wasileski, Farmington, Conn., assignor to General Electric Company

Filed Aug. 6, 1969, Ser. No. 847,892
Int. Cl. H02b *1/20, 1/04*
U.S. Cl. 317—119 **4 Claims**



An electrical control device panel interior assembly comprising an elongated support of relatively thin insulating material supporting three parallel elongated bus bars at the back thereof, a row of connector means centrally at the front

of the support, and cross straps extending from the outer bars to the central connectors through openings in the support and means for supporting a plurality of electrical control devices on the support in connected relation to the connectors.

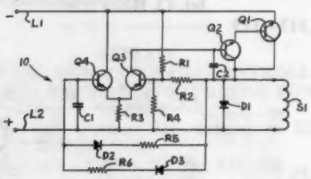
ERRATUM

For Class 317—134 see:
Patent No. 3,587,950

3,588,621
ELECTRONIC PULSE SOURCE FOR ELAPSED TIME INDICATOR

Quentin L. Schneider, Bensenville, Ill., assignor to General Time Corporation, Stamford, Conn.

Filed Jan. 7, 1969, Ser. No. 789,557
Int. Cl. H01h 47/18; H03k 3/26
U.S. Cl. 317—142 12 Claims

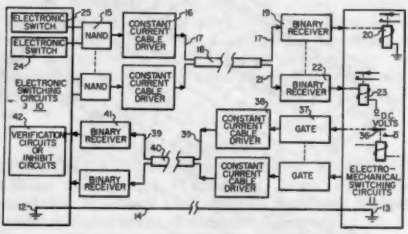


An electronic pulse generator for supplying electrical input pulses to an elapsed time indicator. The generator includes a source of supply voltage, an output means for connecting the generator to the input coil of an elapsed time indicating mechanism, and a pair of transistors connected in circuit with the source and the output means for controlling the production of output signals at the output means. Associated with the transistor pair is a capacitor and another pair of transistors which cooperate to render the first transistor pair alternately conductive and nonconductive in response to charging and discharging of the capacitor to predetermined levels to produce a series of output pulses at the output means.

3,588,622
D.C. CABLE DRIVER CIRCUIT FREE FROM VOLTAGE VARIATIONS BETWEEN SEPARATED GROUNDS

Louis F. Mankowski, Jr., Chicago, and Jeffrey P. Mills, Maywood, Ill., assignors to GTE Automatic Electric Laboratories Incorporated

Filed Apr. 14, 1969, Ser. No. 815,837
Int. Cl. H04m 3/18
U.S. Cl. 317—148.5 2 Claims

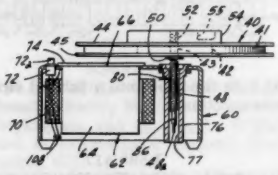


An interface circuit in each line of a cable extending between electromechanical switches and electronic switches has high impedance to noise signals induced into the line. The noise is induced into the line, particularly into its common ground return portion, by operating currents of the electromechanical switches. The high impedance interface circuit substantially eliminates the current caused by noise and thereby prevents undesired operation of the sensitive electronic switches. The high impedance is provided by a transistor connected in the transmitting end of each line, the transistor being connected to operate in a constant-current, unsaturated mode.

3,588,623
BULK DEMAGNETIZER SYSTEM AND METHOD

Marvin Camras, Glencoe, Ill., assignor to IIT Research Institute, Chicago, Ill.

Filed Aug. 7, 1968, Ser. No. 750,874
Int. Cl. H01f 13/00
U.S. Cl. 317—157.5 24 Claims

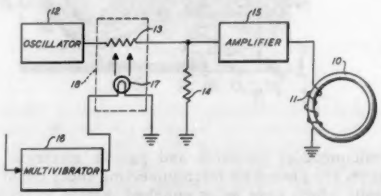


A portable bulk demagnetizer having a shaft receiving a reel of magnetic tape which is rotated to move successive radial segments of the tape through an alternating polarity magnetic field, the shaft being progressively moved axially to move the record medium away from the magnetic field source with sufficient uniformity to effectively demagnetize the tape.

3,588,624
DEMAGNETIZING CIRCUIT

William H. Marvin, Winston-Salem, N.C., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed Nov. 10, 1969, Ser. No. 876,638
Int. Cl. H01f 13/00
U.S. Cl. 317—157.5 2 Claims



A circuit for producing a decreasing magnetic field to demagnetize a magnetic object or material includes an oscillator in series with a radiant energy controlled resistor and a coil. A pulse generator excites a lamp to decrease the resistance of the radiant energy controlled resistor to produce a magnetic field in the coil. The oscillator is selected to have a frequency to produce a predetermined number of cycles during the inherent decay time of the radiant energy controlled resistor and lamp.

3,588,625
ELECTROLYTIC CONDENSER AND PASTE COMPOSITION THEREFOR

Yasukane Kihara, Tokyo; Ushimatsu Moriyama, Fujisawa-shi, and Yoichi Seta, Yokohama-shi, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed Feb. 3, 1969, Ser. No. 796,181
Claims priority, application Japan, Feb. 5, 1968, 43-6716
Int. Cl. H01g 9/02
U.S. Cl. 317—230 5 Claims

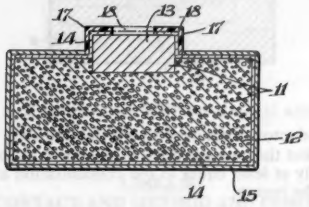
A paste composition consisting of electrolyte compounds, boric acid polyesters of ethylene glycol and N-methyl-2-pyr-

rolidone. When used as an electrolyte for an electrolytic condenser, the composition furnishes said condenser with good electrical properties.

3,588,626
LEADLESS SOLID ELECTROLYTE TANTALUM CAPACITOR

Alan G. Cooper, North Adams, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Apr. 10, 1969, Ser. No. 814,950
Int. Cl. H01g *9/05*
U.S. Cl. 317—230 **5 Claims**



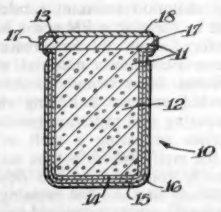
A solid electrolyte tantalum capacitor is provided wherein the wire connection to the tantalum sintered pellet is eliminated.

A nonporous tantalum pad is pressed or welded to the pellet body and, after anodization, a nonwetting, high-temperature resistance coating is applied over the oxide film covering the pad. The coating acts to mask the pad from subsequent semiconductor deposition. An anode connection can then be made either by exposing the surface of the tantalum pad or by welding through the masking and underlying oxide to the pad surface.

3,588,627
LEADLESS SOLID ELECTROLYTE TANTALUM CAPACITOR

Mark Markarian, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Apr. 10, 1969, Ser. No. 815,130
Int. Cl. H01g *9/05*
U.S. Cl. 317—230 **6 Claims**



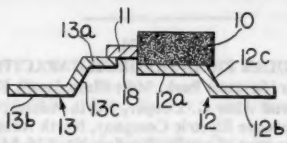
A solid electrolyte tantalum capacitor is provided wherein the wire connection to the tantalum sintered pellet is eliminated. A portion of the pellet is rendered nonporous to anodizing solutions and semiconductor deposition solutions. Following formation of oxide and solid electrolyte deposition, the nonporous area is exposed, reanodized, and reexposed to form a separating margin and the anode connection made directly to this reexposed nonporous area of the pellet.

3,588,628
ENCAPSULATED ELECTRICAL COMPONENT WITH PLANAR TERMINALS

David B. Peck, Williamstown, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed May 7, 1969, Ser. No. 822,584
Int. Cl. H01g *9/05, 1/01*
U.S. Cl. 317—230 **6 Claims**

A packaged electrical component has strain sensitive elements mounted on strain absorbing portions of terminals that are located in an encapsulation which maintains the terminal

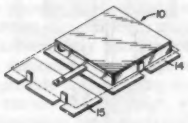


elements of the component in a common plane at a surface of the encapsulation.

3,588,629
ELECTROLYTIC CAPACITOR WITH SUPPORT MEMBERS AS TERMINALS

Richard J. Millard, Williamstown; Warren A. Larson, Lanesboro, and David G. Thompson, Williamstown, Mass., assignors to Sprague Electric Company, North Adams, Mass.

Filed May 7, 1969, Ser. No. 822,585
Int. Cl. H01g *9/05*
U.S. Cl. 317—230 **3 Claims**

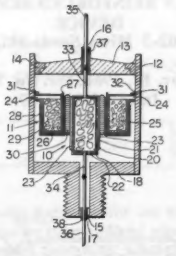


A solid electrolyte capacitor assembly is provided which eliminates the conventional external electrode leads. The capacitor is mounted on a conductive substrate with contact being made by the electrodes to electrically isolated portions of the substrate. Appropriate locations on the underside of the substrate are available for interconnection to printed circuit boards or the like.

3,588,630
NONPOLAR FEED-THROUGH SOLID ELECTROLYTE CAPACITOR

David S. Miller, Severna Park, Md.; Elmo James Presia, Williamstown, and Alan G. Cooper, North Adams, Mass., assignors to Sprague Electric Company, North Adams, Mass.

Filed May 21, 1969, Ser. No. 826,342
Int. Cl. H01g *1/02*
U.S. Cl. 317—230 **7 Claims**



A nonpolar feed-through solid electrolyte capacitor is provided by forming a feed-through solid electrolyte capacitor within the aperture of another solid electrolyte capacitor of tubular configuration, electrically connecting their respective cathodes and connecting the anode of the outer capacitor to a casing. The capacitor assembly offers a low line-to-ground impedance path for high frequency signals and noise and low frequency low impedance path through the feed-through capacitor. High frequency shielding is achieved by a full 360°

continuous, noninductive connection between the grounding lead from the tubular capacitor to the housing and between the capacitor cathodes.

3,588,631

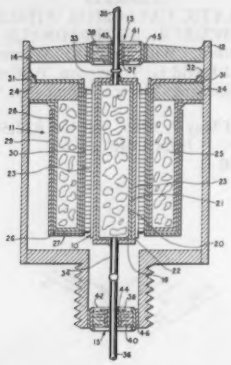
NONPOLAR FEED-THROUGH CAPACITOR

David S. Miller, Severna Park, Md.; Elmo James Fresia, Williamstown, and Alan G. Cooper, North Adams, Mass., assignors to Sprague Electric Company, North Adams, Mass.

Continuation-in-part of application Ser. No. 826,342, May 21, 1969. This application Nov. 17, 1969, Ser. No. 877,344

Int. Cl. H01g *9/08, 9/14*

U.S. Cl. 317—230 **6 Claims**



A nonpolar feed-through solid electrolyte capacitor is provided by forming a feed-through solid electrolyte capacitor within the aperture of another solid electrolyte capacitor of tubular configuration, electrically connecting their respective cathodes and connecting the anode of the outer capacitor to a casing. The capacitor assembly offers a low line-to-ground impedance path for high frequency signals and noise and a low frequency low impedance path through the feed-through capacitor. The low line-to-ground impedance path for high frequency signals is improved by the addition of circular feed-through ceramic capacitors at each terminal. The feed-through ceramic capacitors provide improved frequency response together with hermetic end sealing of the case.

3,588,632

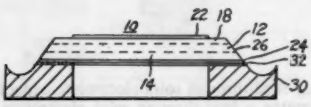
STRUCTURALLY REINFORCED SEMICONDUCTOR DEVICE

Josuke Nakata, 1302-3 Miwa Sanda-Shi, Sanda-shi,Myogo-ken, Japan

Filed Nov. 12, 1968, Ser. No. 774,777

Int. Cl. H01l *5/00*

U.S. Cl. 317—234 **2 Claims**



This disclosure relates to a semiconductor device, including a semiconductor element, which has been structurally reinforced by one or more annular members whereby, the element is able to withstand temperature cycling.

3,588,633

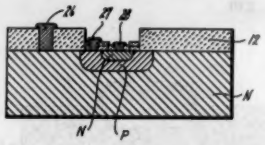
SEMICONDUCTOR STRUCTURE HAVING CONTROLLED BORON IMPURITY DIFFUSION PROFILE

John H. Hayden, Milpitas, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Continuation of application Ser. No. 504,748, Oct. 24, 1965, now abandoned. This application July 16, 1969, Ser. No. 846,636

Int. Cl. H01l *7/02, 5/00*

U.S. Cl. 317—234 **4 Claims**



Semiconductor structure with a boron impurity profile in a region so that the concentration of the boron at the surface is substantially at least equal to the concentration at any other depths in the region.

3,588,634

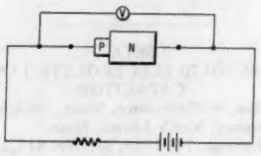
HOT-PRESSED SEMICONDUCTOR DIODE SWITCH

Marvin M. Cohen, Rockville; James D. Penar, Silver Spring, Md., and David W. Kurtz, Arlington, Va., assignors to the United States of America as represented by the Secretary of the Army

Filed Sept. 15, 1969, Ser. No. 858,052

Int. Cl. H01l *3/00, 7/00, 7/32*

U.S. Cl. 317—234 **10 Claims**



A high energy radiation resistant semiconductor diode which is prepared by forming a PN point junction onto the surface of a wafer formed by hot-pressing degenerately doped particulate semiconductor material, said radiation resistant semiconductor diode being characterized by either unidirectional or bidirectional switching characteristics. A technique for preparing said radiation resistant semiconductor diode comprises preparing a melt of semiconductor material, doping the melt with an N-type material, crystallizing the doped melt, comminuting the doped crystal to a predetermined particle size and hot-pressing the particles so as to form a semiconductor wafer having a reproducible electrical characteristic. In a first embodiment, the wafer is contacted with a metallic whiskerlike probe to form the necessary PN junction, and is alloyed on a second surface to an ohmic contact. This embodiment provides a diode with a unidirectional "switching" characteristic. Alternatively, the wafer is contacted with two metallic whiskerlike probes so as to form two PN junctions. This alternative embodiment produces a diode which is capable of bidirectional switching.

3,588,635

INTEGRATED CIRCUIT

Albert H. Medwin, Whippany, N.J., assignor to RCA Corporation

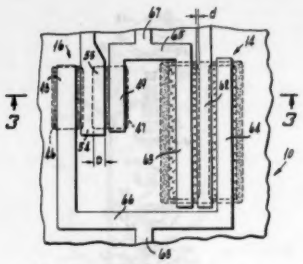
Filed Apr. 2, 1969, Ser. No. 812,613

Int. Cl. H01l *11/00;* **H01c** *7/14;* **H01l** *19/00*

U.S. Cl. 317—235R **2 Claims**

In an integrated circuit including a complementary pair of insulated gate field effect transistors, each device has the same transconductance and means are provided to increase

the gate to drain capacitance of the N-type device to match that of the P-type device. When the transistors are operated



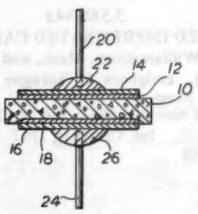
in parallel as a switch, they will pass a signal without distortion.

3,588,636

OHMIC CONTACT AND METHOD AND COMPOSITION FOR FORMING SAME

William Otto Giesfeldt, Milwaukee, and Roy Lee Pinnow, Wauwatosa, Wis., assignors to Globe-Union Inc., Milwaukee, Wis.

Filed Jan. 27, 1969, Ser. No. 794,020
Int. Cl. H01l 3/20
U.S. Cl. 317—238 **9 Claims**



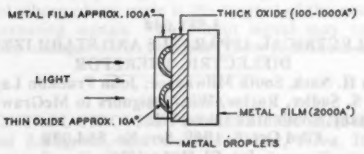
A semiconductive device such as a reduced barium titanate is provided with at least one ohmic contact consisting essentially of a hypoeutectic alloy of nickel and indium. The contact may be formed by applying to the surface of the semiconductor a layer of a composition containing reducible compounds of nickel and indium and then firing the device at a liquifying temperature under reducing conditions.

3,588,637

MACROMOLECULAR MEMORY CIRCUIT

Robert C. Jaklevic, and John J. Lambe, Birmingham, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed May 15, 1969, Ser. No. 824,891
Int. Cl. H01l 9/00
U.S. Cl. 317—238 **6 Claims**



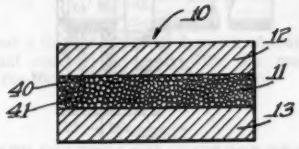
This invention teaches a device incorporating in one very small area a very large number of "macromolecular" circuits. Each of these circuits includes a tunneling resistor in parallel with a small capacitor capable of controlled relaxation and both elements being in series with a further capacitor. This device at low temperatures serves as a memory element. element.

3,588,638

CURRENT CONTROLLING DEVICE INCLUDING VO2

Gordon R. Fleming, Pontiac, and Stanford R. Ovshinsky, Bloomfield Hills, Mich., Energy Conversion Devices, Inc. Troy, Mich.

Continuation-in-part of application Ser. No. 809,580, Mar. 24, 1969. This application May 27, 1969, Ser. No. 830,581
Int. Cl. H01l 9/00
U.S. Cl. 317—238 **14 Claims**



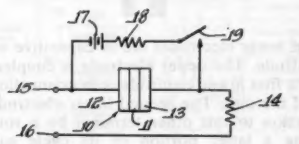
A current controlling device for an electrical circuit including a semiconductor element and electrodes in low electrical resistance contact therewith, wherein said semiconductor element has a threshold voltage value and a high electrical resistance to provide a blocking condition for substantially blocking current therethrough, wherein the high electrical resistance is substantially instantaneously decreased to a low resistance in response to a voltage above said threshold voltage value to provide a conducting condition for substantially conducting current therethrough, wherein the semiconductor element comprises high electrical resistance refractory powder particles substantially individually coated with a thin solid coating of substantially VO_2, wherein the high electrical resistance refractory powder particles may comprise SnO_2, SiO_2, Al_2O_3, ZrO_2 or TiO_2 or the like, wherein the thin substantially VO_2 coating on the particles is obtained from V_2O_5 and/or V_2O_3 in the formation thereof by several methods described herein, wherein the devices may be of the non-memory type or the memory type, and wherein the devices may have an intermediate or partial conducting condition.

3,588,639

CURRENT CONTROLLING DEVICE INCLUDING A VO2 FILM

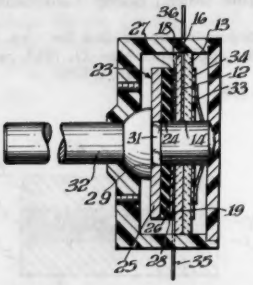
Gordon R. Fleming, Pontiac, and Stanford R. Ovshinsky, Bloomfield Hills, Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Continuation-in-part of application Ser. No. 809,205, Mar. 21, 1969. This application May 27, 1969, Ser. No. 830,582
Int. Cl. H01l 9/00
U.S. Cl. 317—238 **8 Claims**



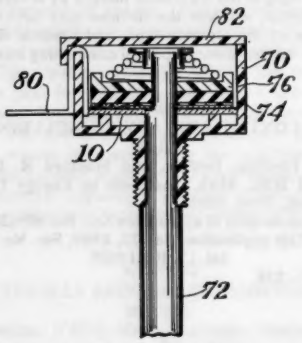
A current controlling device for an electrical circuit including a semiconductor element and electrodes in low electrical resistance contact therewith, wherein said semiconductor element has a threshold voltage value and a high electrical resistance to provide a blocking condition for substantially blocking current therethrough, wherein the high electrical resistance is substantially instantaneously decreased to a low resistance in response to a voltage above said threshold voltage value to provide a conducting condition for substantially conducting current therethrough, and wherein the semiconductor element between the electrodes comprises a thin substantially amorphous film of substantially VO_2 having high electrical resistance.

3,588,640
HIGH CAPACITANCE VARIABLE CAPACITOR
John H. Fabricius, Stamford, Vt., assignor to Sprague Electric Company, North Adams, Mass.
Filed Nov. 28, 1969, Ser. No. 880,529
Int. Cl. H01g 5/08
U.S. Cl. 317—249 10 Claims



In a laminated structure, one electrode is disposed on a thin ceramic dielectric member in overlying relation to a lower electrode, and includes a plurality of spaced conductive island areas which are capable of being interconnected in parallel by a movable flexible wiper that provides electrical connection between the islands and an adjacent terminal of the capacitor.

3,588,641
ROTARY VARIABLE CAPACITOR
John H. Fabricius, Stamford, Vt., assignor to Sprague Electric Company, North Adams, Mass.
Filed Nov. 28, 1969, Ser. No. 880,530
Int. Cl. H01g 5/08
U.S. Cl. 317—249 10 Claims



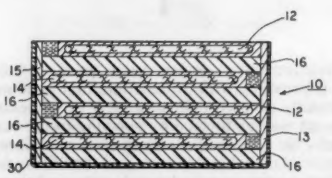
A pair of lower electrodes are in capacitive relation to an upper electrode. The upper electrode is coupled to one terminal and a first lower electrode is in connection to another terminal of the unit. The second lower electrode is adapted for connection to this other terminal by a rotary member only during a latter portion of its cycle such that the capacitance associated with the one lower electrode is only presented across the terminals during this portion of the cycle.

3,588,642
VARIABLE ELECTRONIC COMPONENT
John H. Fabricius, Stamford, Vt., and John P. Maher, North Adams, Mass., assignors to Sprague Electric Company, North Adams, Mass.
Filed Nov. 28, 1969, Ser. No. 880,531
Int. Cl. H01g 5/06
U.S. Cl. 317—249 9 Claims

A rotor and stator element are disposed in a preformed casing with terminal leads of the stator extended from within the casing and along an outer wall thereof, and a cover of insulative material is joined to the casing and extended over

portions of the terminals so as to sandwich them between the outer wall surface and the cover extension.

3,588,643
COATED IMPREGNATED CAPACITOR
Sidney D. Ross, Williamstown, Mass., and Franklin D. Frantz, Woodford, Vt., assignors to Sprague Electric Company, North Adams, Mass.
Filed Nov. 12, 1969, Ser. No. 875,845
Int. Cl. H01g 1/02
U.S. Cl. 317—258 8 Claims

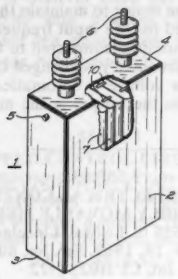


A convolutely wound metallized capacitor, fully impregnated with a liquid dielectric, is treated with a polyisocyanate such that the impregnant on the surface of the capacitor section is subjected to a nonradical reaction so as to provide a tough polymer skin of controlled thickness around the section. The preferred impregnant is castor oil which is reacted with a polyisocyanate to form the skin.

3,588,644
ELECTRICAL APPARATUS AND STABILIZED DIELECTRIC THEREFOR
William H. Nash, South Milwaukee; John Franklin Lapp, and Fred S. Sadler, Racine, Wis., assignors to McGraw-Edison Company, South Milwaukee, Wis.
Filed Oct. 6, 1969, Ser. No. 864,038
Int. Cl. H01g 3/04
U.S. Cl. 317—259 9 Claims

A dielectric composition for use in electrical apparatus such as a capacitor. The composition includes a halogenated aromatic dielectric liquid with the following additive, 1, 2 epoxy-3-phenoxypropane, and with or without the additive, bis (3, 4-epoxy-6-methylcyclohexylmethyl) adipate. A preferred composition comprises chlorinated diphenyl with

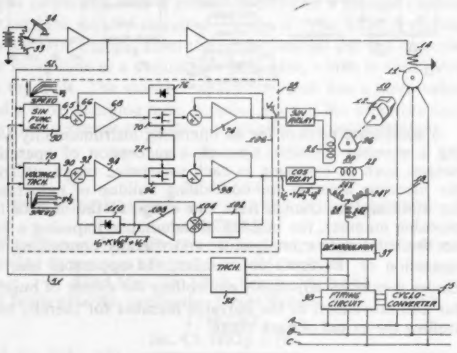
additives of 0.15 percent 1, 2, epoxy-3-phenoxypropane and 0.25 percent bis (3, 4-epoxy-6-methylcyclohexylmethyl) adipate. This composition has a lower dissipation factor and a prolonged life characteristic.



3,588,645
SYSTEM FOR CONTROLLING MAGNITUDE AND PHASE OF TERMINAL VOLTAGE FOR ADJUSTABLE SPEED SYNCHRONOUS MOTOR

Thomas P. Gilmore, Wauwatosa, Wis., assignor to Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

Filed July 10, 1968, Ser. No. 743,873
Int. Cl. H02p *5/24*
U.S. Cl. 318—142 **22 Claims**



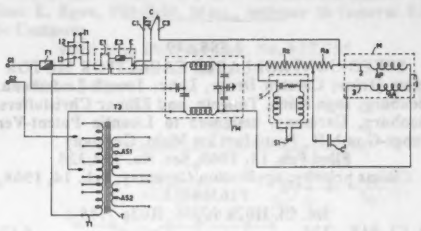
A system for generating a control signal for an adjustable speed synchronous motor which is a replica of the desired terminal voltage to be applied to the motor in frequency, magnitude and phase. It includes tachometer means for deriving a speed signal which is a function of motor speed, means responsive to the speed signal for generating first and second alternating signals in accordance with the rectangular coordinates of a curve whose variable parameter is motor speed and whose polar coordinates are desired magnitude and phase angle of motor terminal voltage, and rotary inductor, vector adder means which converts the alternating signals into an output signal whose magnitude is the vector sum and whose phase angle is the tangent of the quotient of the alternating signals. The output signal may control a frequency changer which energizes the synchronous motor.

3,588,646
CONTROL CIRCUITS FOR ELECTRIC MOTORS

Giovanni Zaffignani, and Gualtiero Mioc, Ivrea, Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Torino), Italy

Filed Oct. 1, 1968, Ser. No. 764,139
Claims priority, application Italy, Oct. 3, 1967, 53223-A/67
Int. Cl. H02p *5/30*
U.S. Cl. 318—221 **2 Claims**

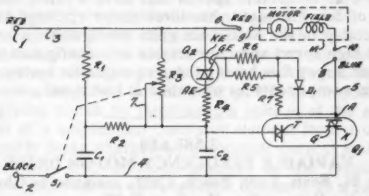
A control circuit for speed regulation of an asynchronous motor having at least a main and a second field winding and provided with a centrifugal switch which effectively inserts and takes out of circuit a ballast resistor in series with both said windings. In order to reduce the variations in speed in such a circuit a further centrifugal switch operates to insert an additional resistor in series with the main winding throughout the running condition of the motor.



3,588,647
AC POWER CONTROL CIRCUITS FOR REACTIVE POWER LOADS

Jack B. Harwell, Euless, Tex., assignor to Electronic Control Corporation, Euless, Tex.

Filed Apr. 1, 1968, Ser. No. 725,247
Int. Cl. H02p *5/40*
U.S. Cl. 318—227 **13 Claims**

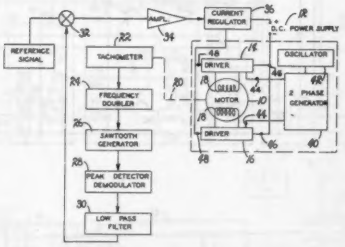


An AC power control circuit for reactive loads and various motors including a phase control trigger circuit for actuating a power control switch wherein the trigger circuit timing impedance is varied in accordance with an impedance varying element reactive in a motor feedback circuit.

3,588,648
D.C. SERVO SYSTEM INCLUDING AN A.C. MOTOR

T. O. Paine, Administrator of the National Aeronautics and Space Administration with respect to an invention of, and Edmund J. Bahm, Altadena, Calif.

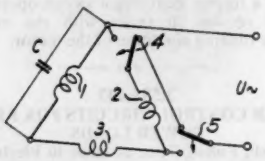
Filed July 9, 1969, Ser. No. 840,308
Int. Cl. H02p *5/40*
U.S. Cl. 318—227 **4 Claims**



A servosystem including an AC (Alternating Current) induction motor, designed for asynchronous operation, and a DC (Direct Current) to an AC inverter for driving the motor in response to a DC potential, a current regulator for controlling the potential and a closed loop circuit connected with the output of the motor for detecting deviation in motor speed, relative to a preselected speed, and a circuit for controlling the current regulator in response to detected deviations, whereby the slow speed characteristics of a DC motor and a smooth torque characteristic of an AC asynchronous

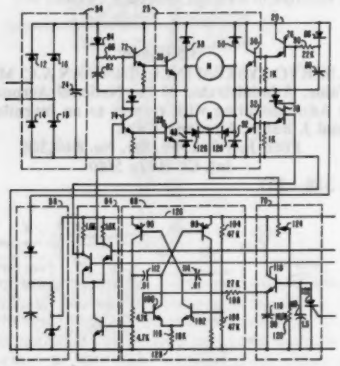
motor are combined to provide a variable speed system having a capability for achieving and maintaining smooth torque outputs at selected speeds, in the absence of speed reduction gear trains and the like.

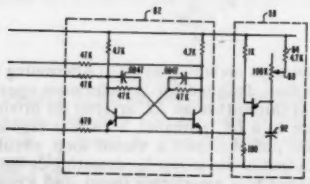
3,588,649
SPEED-CONTROLLABLE CAPACITOR MOTOR
Gunter Heine; Carsten Droge, Lahr; Joseph Ludemann, Oldenburg; Ingo Koch, Tungeln, and Elimar Christoffers, Oldenburg, Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany
Filed Feb. 11, 1969, Ser. No. 798,326
Claims priority, application Germany, Feb. 14, 1968, P1638440.0
Int. Cl. H02k *17/06;* **H02p** *7/48*
U.S. Cl. 318—224 **5 Claims**



A speed-controllable single-phase capacitor motor which is operable at two stable speeds that have a ratio, one to the other, of 3:1. The motor has three stator windings which are connectable in the Steinmetz delta configuration for operation at high speed and connectable in a configuration which forms an airgap flux having the zero-sequence system as symmetrical components for operation at low speed.

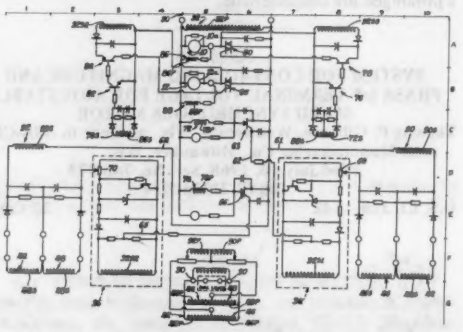
3,588,650
VARIABLE FREQUENCY MOTOR DRIVE
Jeffrey M. Bevis, Long Beach, Calif., assignor to Chaico Engineering Corporation, Gardena, Calif.
Filed Sept. 5, 1969, Ser. No. 862,609
Int. Cl. H02p *5/40*
U.S. Cl. 318—227 **3 Claims**





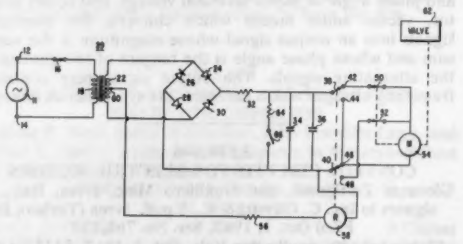
The speed of an AC motor can be controlled by varying the input frequency and voltage supplied to the motor. The invention is characterized by a solid-state switch bridge connected to the electric motor for supplying generally square wave voltage pulses to the motor at the desired frequency. The square voltage pulses are chopped to adjust the average voltage supplied to the motor to maintain the constant torque characteristic required for the input frequency to the motor. An RC attenuating circuit is connected to the motor in such a way that when the frequency is changed the regulated level of the average motor voltage is automatically changed to a value which maintains the torque in the motor substantially constant.

3,588,651
SOLID STATE ELECTRICAL CONTROL FOR A REVERSIBLY MOVABLE MEMBER
Arthur K. Littwin, 6555 N. Le Mai, Lincolnwood, Ill.
Filed Mar. 18, 1969, Ser. No. 808,282
Int. Cl. H02p *1/22*
U.S. Cl. 318—266 **8 Claims**



A solid-state control for an operating instrumentality having a member movable through a succession of operating ranges, such as reversing in each successive range, utilizing the movable member for controlling buildup of inductance for effecting the change from one range to the next of the movable member, the buildup of inductance imposing a bias on the solid-state components, and thereby controlling the operation of the movable member; the apparatus also includes means for adjustably controlling the extent of buildup for unit movement of the movable member for thereby controlling the extent of each range.

3,588,652
FAIL SAFE MECHANISM FOR REVERSIBLE MOTORS
Robin B. Lewis, Hardwick, Mass., assignor to Jamesbury Corporation, Worcester, Mass.
Filed Oct. 6, 1969, Ser. No. 863,835
Int. Cl. G05b *9/02*
U.S. Cl. 318—282 **11 Claims**



An electric fail safe device for a valve actuator comprising a reversible motor wherein the application of electric current

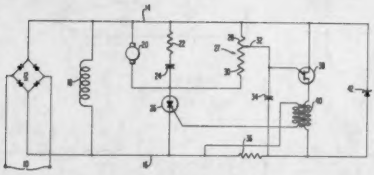
to drive the reversible motor from its "safe" position energizes a relay and charges a capacitor. Upon failure of the power supply, the relay is deenergized and the energy stored in the capacitor is used to drive the reversible motor to return the valve to its "safe" position. Limit switches are provided to disconnect the motor from the driving circuitry whenever the motor has completely opened or completely closed the valve.

3,588,653

MOTOR SPEED CONTROL CIRCUIT HAVING FEEDBACK RESPONSIVE TO LOAD POWER DEMAND

Don J. Corrigall, Appleton, Wis., assignor to Miller Electric Manufacturing Company, Appleton, Wis.

Filed Mar. 21, 1968, Ser. No. 715,036
Int. Cl. H02p *5/16*
U.S. Cl. 318—331 **7 Claims**



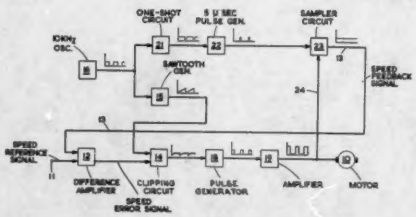
A motor speed control circuit in which the armature winding is in parallel with a potentiometer and a storage capacitor, and the parallel circuit is in series with an SCR. A second capacitor is charged from the potentiometer tap and controls the firing time of a unijunction transistor, which in turn gates on the SCR. The storage capacitor, which has a large value and a short charging time, supplies most of the armature current and serves as a feedback source for the potentiometer.

3,588,654

SPEED INDICATING APPARATUS FOR ELECTRIC MOTORS

Miklos Balazs, Stoke-On-Trent, England, assignor to International Computers Limited, London, England

Filed Mar. 26, 1969, Ser. No. 810,662
Claims priority, application Great Britain, Apr. 11, 1968, 17562/68
Int. Cl. H02p *5/16*
U.S. Cl. 318—331 **1 Claim**



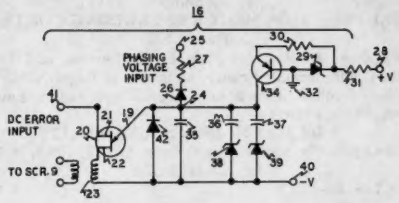
Apparatus is disclosed for controlling the speed of an electric motor. The armature of the motor is driven by a succession of discrete pulses, the armature being unenergized during the time intervals occurring between successive pulses. The voltage across the armature is sampled during the time interval between successive energization pulses to produce a speed feedback signal which is compared with a reference signal and a speed error signal is generated to control the energization of the armature.

3,588,655

MOTOR CONTROL SYSTEM WITH UNIJUNCTION TRIGGERING CIRCUIT TO COMPENSATE FOR THE NONLINEARITY OF AN SCR AMPLIFIER

William E. Egan, Pittsfield, Mass., assignor to General Electric Company

Filed May 26, 1969, Ser. No. 827,755
Int. Cl. H02p *5/16*
U.S. Cl. 318—345 **6 Claims**



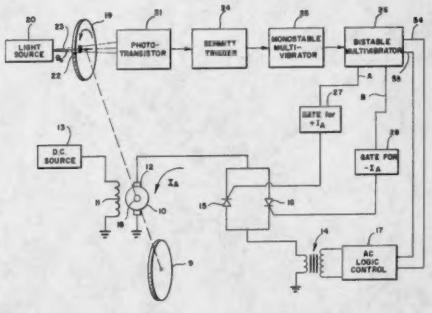
A motor control system utilizing a phase control power amplifier with controlled rectifiers which includes unijunction transistor triggering circuit means to vary the magnitude of actuating signals to said power amplifier and compensate for gain variation occurring in the rectification system. In order to linearize the relationship between current in the controlled motor and input control signal applied to the motor control system over the range of operation, a nonlinear relationship is provided in the triggering circuit means between variation of the triggering pulse with input control signal to compensate for a nonlinear response between variation of current with firing angle in the control rectifier stage of the power amplifier. A nonlinear gain is accomplished in the triggering circuit by impressing a voltage at the emitter electrode of a unijunction transistor element from a capacitor assembly being charged by a constant current source so as to provide discrete slope changes in the relationship between voltage across the capacitor elements as a function of the charging time. By utilization of a phasing voltage in said circuit, the triggering pulses are synchronized for operation with the AC power source to the controlled motor. In a preferred embodiment, the triggering circuit also includes means to vary the charging of the capacitor assembly as a function of the magnitude of the back EMF in the controlled motor thereby providing improved linearity of response for speed changes in said motor.

3,588,656

PROGRAMMABLE ELECTROMECHANICAL OSCILLATOR

Fred M. Shofner, Tullahoma, Tenn., assignor to The University of Tennesse Research Corporation, Knoxville, Tenn.

Filed Aug. 7, 1968, Ser. No. 750,844
Int. Cl. H02p *1/00*
U.S. Cl. 318—282 **5 Claims**



An electromechanical oscillator is provided for automatically shaking and mixing low-reaction rate chemicals. The

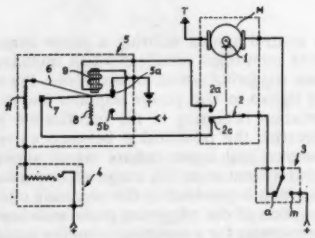
programmable oscillator includes a reversible DC drive motor adapted to be energized to supply both oscillatory and rotational motion. Oscillatory and rotational motion are established by selectively gating one of a pair of SCR's to reverse the sense of armature current of the drive motor. Timer and latching relay logic circuits provide desired programming of the oscillator about or at a prescribed angular position.

3,588,657

DELAY-ACTION MOTOR ENERGIZING CONTROL DEVICES

Phillippe A. R. Rouvre; Jean E. X. Pineau, and Francois Peroy, Billancourt, France, assignors to Regie National Des Usines Renault, Billancourt, France and Automobiles Peugeot, Paris, France

Filed June 26, 1969, Ser. No. 836,722
Claims priority, application France, Aug. 7, 1968, 162,146
Int. Cl. H02h *7/08*
U.S. Cl. 318—471 **6 Claims**



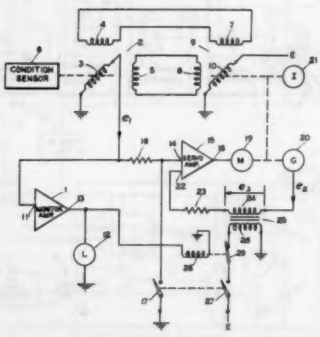
This control device, for the delay-action energization of an electric motor of the type adapted to be braked by short-circuiting the armature driving a mechanism having a predetermined fixed-stop position, comprises a fixed-stop device for short-circuiting said armature and a thermal delay-action device associated with said fixed-stop device for restarting the motor after a predetermined time period. It utilizes a heating-wire thermal delay-action device wherein the heating wire proper is operatively connected to a contact arm movable between a motor energizing contact and an armature short-circuiting contact against which said wire is normally urged in its cold condition.

3,588,658

SERVO SYSTEM HAVING A MONITOR AND TRIP LEVEL TEST MEANS

Peter C. Van Der Sluys, Wayne; George E. Ellis, Franklin Lakes, N.J.; Louis Levine, Bronx, N.Y., and Fred P. Modrow, Union, N.J., assignors to The Bendix Corporation

Filed Dec. 23, 1968, Ser. No. 786,064
Int. Cl. G05b *9/02*
U.S. Cl. 318—563 **12 Claims**



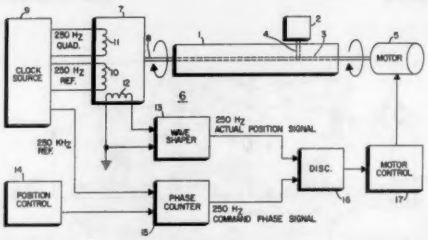
A condition indicator operated by a servo means, having a servoamplifier and a monitor, indicates a sensed condition. The monitor provides an alarm when a specified difference exists between the sensed condition and the indicated condition. A test means shorts the servo means input to ground and applies a voltage to the servo means to operate the servo until the monitor provides the alarm. The monitor trip level can be determined by reading the change in reading of the indicator during the test.

3,588,659

HETERODYNE SYSTEM FOR A POSITION SERVOMECHANISM WHEREBY SYSTEM IS ADAPTABLE TO A PLURALITY OF TRANSDUCERS

George L. Rogers, Waynesboro, Va., assignor to General Electric Company

Filed Sept. 19, 1968, Ser. No. 760,777
Int. Cl. G05b *1/01*
U.S. Cl. 318—608 **13 Claims**



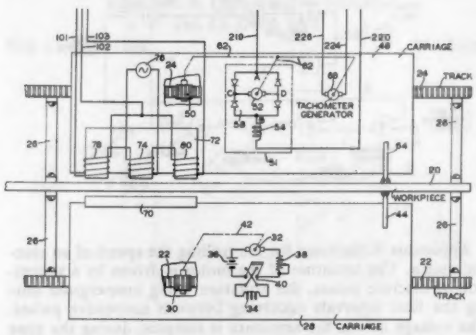
A phase position control system for machine tools is illustrated and described which includes a high frequency position indicator, a summation circuit for summing or heterodyning the output of the indicator with a reference signal of slightly different frequency, and a filter and waveshaper circuit for eliminating all components of the indicator output except the AC fundamental of the difference component envelope. A signal derived from the envelope is compared in a discriminator with a command phase signal of equal frequency whereby any difference in phase provides an output to drive a servomotor so that a machine tool may be moved to the desired position. In this manner, a single servosystem can be made compatible with any position indicator available.

3,588,660

MASTER-SLAVE PLURAL MOTOR POSITIONING CONTROL

Rawlins E. Purkhiser, Springfield, N.J., assignor to Air Reduction Company, Incorporated, New York, N.Y.

Filed Oct. 17, 1966, Ser. No. 587,003
Int. Cl. G05b *1/06;* **B23k** *9/12*
U.S. Cl. 318—658 **6 Claims**



A synchronizing system for welding both sides of a magnetic plate including a master motor driven carriage moving

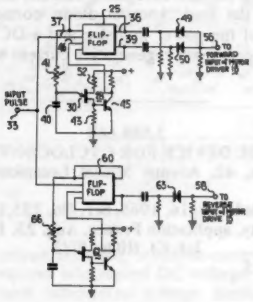
along one side of the plate and carrying an AC magnetic field generator which is E-shaped, a slave motor driven carriage to be moved in synchronism on the opposite side of the plate and carrying an armature which unbalances the magnetic field if the carriages are out of synchronism, the E-shaped generator including secondary windings sensing the unbalance, and motor control means controlling the slave motor accordingly.

3,588,661

ELECTRONIC DAMPING FOR STEPPING MOTORS

Harold R. Newell, South Newbury, N.H., assignor to Mesur-Matic Electronics Corporation, Warner, N.H.

Filed Apr. 24, 1968, Ser. No. 723,808
Int. Cl. H02k *37/00*
U.S. Cl. 318—696 **4 Claims**



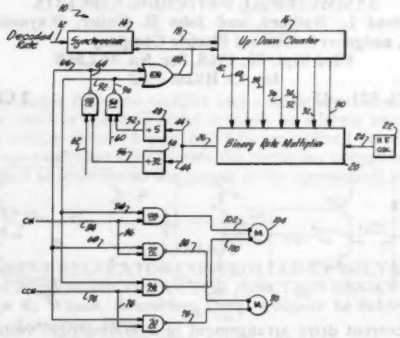
Electronic damping of a stepping motor is provided to suppress the oscillatory response of the shaft at the conclusion of a step, by energizing the motor driving circuit to excite the motor phases in a forward switching sequence interrupted by a switching reversal prior to conclusion of the selected step. The precisely timed forward, reverse, forward switching produces a slowing of the shaft to effect a smooth transition between initial and final position of a step, with positive cessation of rotation upon attainment of the final position.

3,588,662

PULSE DISTRIBUTION MODIFIER

Edgar W. Buebel, Jr., Cockeysville, Md., and Ronald J. King, Cambridge, Ohio, assignors to the United States of America as represented by the Secretary of the Navy

Filed Mar. 14, 1969, Ser. No. 807,226
Int. Cl. G05b *19/40*
U.S. Cl. 318—696 **3 Claims**



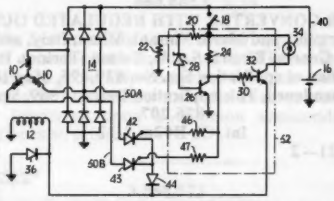
A pulse distribution modifier is described which operates to smooth the transition between different pulse repetition rates through the use of an up-down counter which increases by one count for each pulse input and decreases by one count for each pulse output of the modifier. A variable frequency multiplier is responsive to the count in the counter to apply a factor proportional to the count to a high frequency oscillator output to provide a pulse rate which is then divided by another predetermined factor to provide the desired modifier output.

3,588,663

CONTROL FOR CHARGING GENERATOR

Tsuyoshi Hirata, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 24, 1968, Ser. No. 786,619
Claims priority, application Japan, Dec. 28, 1967, 42-109894
Int. Cl. H02j *7/24*
U.S. Cl. 320—39 **4 Claims**



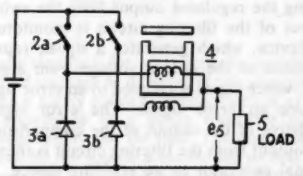
With a battery not being charged a switching transistor turns ON to fire an indication lamp while a charging generator is separately excited. When a voltage across the generator additionally selfiexcited reached a predetermined magnitude a control transistor conducts to turn OFF the switching transistor. This deenergizes the lamp and interrupts the application of all excitation to the generator. Both transistors and the associated components are formed into an integrated circuit.

3,588,664

MULTIPHASE DC CHOPPER CIRCUIT

Masahiko Akamatsu, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 1, 1969, Ser. No. 812,250
Int. Cl. H02m *3/32*
U.S. Cl. 321—2 **6 Claims**



A reactor includes windings connected between thyristor-type choppers and a load. The windings are magnetically coupled with one another so as to maintain flows of current therethrough substantially equal in magnitude to one another.

3,588,665

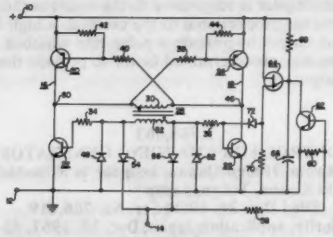
TRANSFORMER INVERTER

Frank G. Willard, Monroeville, and James F. Sutherland, Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 3, 1969, Ser. No. 813,228
Int. Cl. H02m *3/22*
U.S. Cl. 321—2 **11 Claims**

Described is a transformer-type voltage inverter, typically

used as a low dissipation, high current voltage reducer for integrated circuits, which employs a simple two-winding transformer as a feedback and timing means.



3,588,666

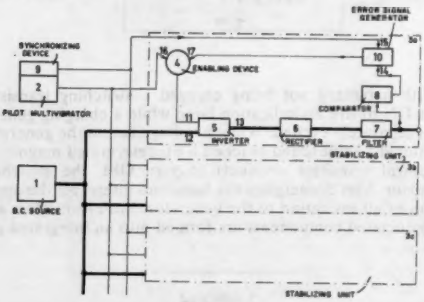
POWER CONVERTER WITH REGULATED OUTPUT

Gianni Bertolini, and Mario Vinsani, Milan, Italy, assignors to Olivetti-General Electric S.p.A., Caluso (Torino), Italy

Continuation of application Ser. No. 639,495, May 18, 1967, now abandoned. This application Dec. 1, 1969, Ser. No. 876,207

Int. Cl. H02m *3/32*

U.S. Cl. 321—2 **5 Claims**



Apparatus for regulating direct current power from an unregulated direct current power source comprising a constant frequency pilot oscillator and at least one stabilizing unit. Each stabilizing unit includes switching means for interrupting the current from the direct current power source during a portion of each cycle which is controlled by the pilot oscillator, and including a rectifying circuit and a filtering circuit for refining the regulated output from the switching means. The output of the filtering circuit is monitored by a comparison device, which generates a signal, representative of the variations of the output voltage from a predetermined level and, which signal is coupled to an error signal generator to produce an error signal. The error signal, which is representative of the output of the comparison device, and thus the output from the filtering circuit is then fed from the error signal generator to an enabling device. The enabling device generates a signal to control the conduction and nonconduction intervals of the switching device, as a function of the variation of the output voltage from a predetermined value.

3,588,667

MEANS FOR CONTROLLING BACK VOLTAGE ACROSS POWER THYRISTORS DURING COMMUTATION THEREOF

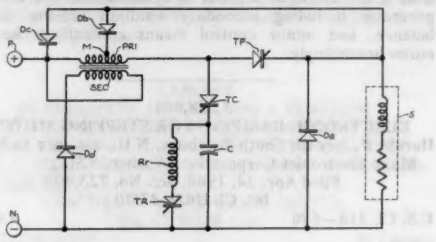
David L. Duff, Burlington, Ontario, and Shashi B. Dewan, Toronto, Ontario, Canada, assignors to Marathon Electric Research of Canada Ltd, Oakville, Ontario, Canada

Filed Nov. 13, 1969, Ser. No. 876,319

Int. Cl. H02m *7/20, 7/44*

U.S. Cl. 321—5 **6 Claims**

In apparatus comprising a power thyristor for controlling energization of a load from a DC source, a commutating capacitor, a commutating thyristor, and a reactor winding, back voltages across the power thyristor during commutation are limited by a diode connected between the load side of the power thyristor and a medial tap on the reactor winding, arranged to block flow of energizing current between the DC terminals and the load. Another diode, connected between the load side of the power thyristor and a DC terminal, and similarly arranged, feeds regenerative current back to the DC source.



3,588,668

CONTROL DEVICE FOR CYCLOCONVERTERS

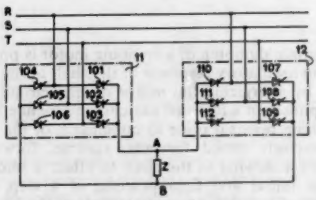
Francois Cova, 42, Avenue Michel Leconictre, 44 Nantes, France

Filed Aug. 16, 1968, Ser. No. 753,155

Claims priority, application France, Aug. 23, 1967, 118,709

Int. Cl. H02m *7/12*

U.S. Cl. 321—5 **3 Claims**



A blocking device prevents the simultaneous operation of two rectifying groups of the cycloconverter. A pilot device furnishes from a polyphase supply network a pilot network which is perfectly in phase with the supply network. A logic contact device delivers to the control electrodes of the thyristors of each rectifying group which must be conductive pulses throughout the conduction time this or each of the rectifying groups.

3,588,669

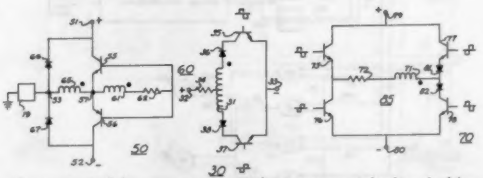
CURRENT DRIVE ARRANGEMENT FOR SYMMETRICAL SWITCHING CIRCUITS

Armistead L. Wellford, and John H. Cutler, Waynesboro, Va., assignors to General Electric Company

Filed Sept. 26, 1968, Ser. No. 762,868

Int. Cl. H02m *7/52*

U.S. Cl. 321—45 **2 Claims**



A current drive arrangement in a symmetrical switching circuit. Alternately conducting switching transistors respectively connect the positive and negative terminal of a DC source to a load. A single magnetic device, a current transformer having a plurality of windings, is provided. Drive current is coupled from a first winding to the bases of the

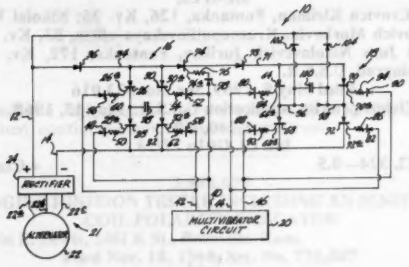
transistors to turn one transistor on and bias the other transistor off. Another winding of the transformer is connected to couple load current to the transistor bases to provide regenerative drive. When the drive signal reverses in polarity, the magnetic device couples the drive current and the load current to the transistors to provide proper commutation.

3,588,670

INVERTER COMMUTATION CIRCUIT

William L. King, springfield, Oreg., assignor to Nathan E. Knecht, Springfield, Oreg.

Filed Aug. 7, 1969, Ser. No. 848,203
Int. Cl. H02m *7/52*
U.S. Cl. 321—45 **8 Claims**



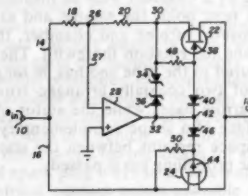
An inverter circuit including a silicon-controlled rectifier bridge which requires interrupted DC voltage, and circuitry for supplying such interrupted voltage. Such circuitry includes a silicon-controlled rectifier interrupter through which voltage from a source of continuous DC voltage may be supplied, and a capacitor which through charging and discharging under the influence of another silicon-controlled rectifier bridge controls the operating state of the interrupter.

3,588,671

PRECISION RECTIFIER WITH FET SWITCHING MEANS

Gordon J. Deboo, Sunnyvale, and Roger C. Hedlund, San Jose, Calif., assignors to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed Jan. 24, 1969, Ser. No. 793,823
Int. Cl. H02m *7/02*; **H03k** *5/20*
U.S. Cl. 321—47 **3 Claims**



A precision full-wave rectifier uses a single operational amplifier which is operated simultaneously as a linear amplifier and a switch driver. A pair of FETs are utilized as voltage responsive switches for effecting the rectifying operation and are gated in response to the output of the operational amplifier.

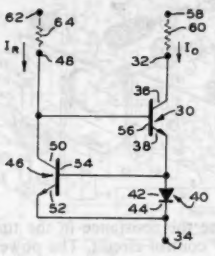
3,588,672

CURRENT REGULATOR CONTROLLED BY VOLTAGE ACROSS SEMICONDUCTOR JUNCTION DEVICE

George R. Wilson, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Feb. 8, 1968, Ser. No. 704,106
Int. Cl. G05f *1/56*
U.S. Cl. 323—4 **10 Claims**

A current regulating circuit or current source includes a first transistor connected in series with a semiconductor junction device for developing a voltage proportional to the current flowing through such first transistor. A second transistor has its base connected to the semiconductor junction device whereby current in the second transistor is modified in response to the voltage across the junction device. In turn, the collector of the second transistor is connected so that it



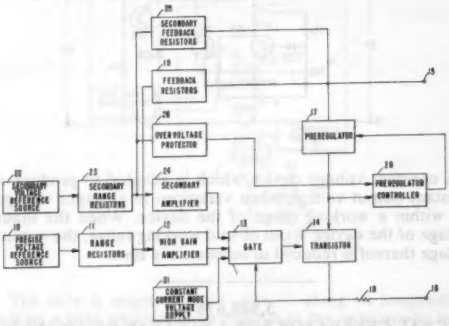
controls the first transistor in a sense for opposing change in the output current of the first transistor. The semiconductor junction device preferably comprises the base-emitter junction of a third transistor, and all three transistors are desirably fabricated upon a common semiconductor integrated circuit structure.

3,588,673

MULTILEVEL SOLID STATE DC VOLTAGE STANDARD

Harold R. Ahrens, San Diego, Calif., assignor to Cohu Electronics Inc., San Diego, Calif.

Filed Apr. 29, 1968, Ser. No. 725,094
Int. Cl. G05f *1/58*, *1/64*
U.S. Cl. 323—9 **15 Claims**



A DC voltage standard for electronically providing very accurate standard voltages at different levels. An operational amplifier having a highly stable reference voltage as an input controls the impedance of a series transistor connected between a voltage supply and the load. The magnitude of the voltage produced by the source is controlled so that the voltage drop across the output transistor does not exceed its capacity. Any error between the stable input voltage and the voltage across the load is applied by a feedback circuit to the input of the amplifier so that the output voltage remains fixed. Circuits are provided for protecting the load against overcurrent, overvoltage and output transistor failure.

3,588,674

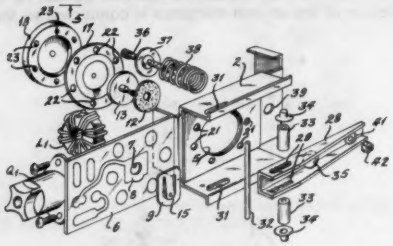
ELECTROMECHANICAL PNEUMATIC POWER CONTROLLER FOR ENVIRONMENTAL CONDITIONING SYSTEMS

Clarence E. Rasmussen, Janesville, Wis., assignor to Electronic Control Corporation, Euless, Tex.

Filed Sept. 12, 1968, Ser. No. 759,312
Int. Cl. G05f *3/04*
U.S. Cl. 323—19 **7 Claims**

An electromechanical pneumatic power controller for environmental conditioning systems having a variable resistor

responsive to variations in pneumatic pressure signals created by an environmental condition sensor, such as a temperature transducer for generating such pneumatic signals, indicative of the environmental conditions, such as temperature, to in-



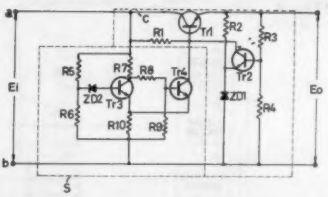
crease or decrease the resistance in the timing circuit of a solid state power control circuit. The power controller features electromechanical integration with advanced electronic circuits in a compact unit.

3,588,675

VOLTAGE REGULATOR CIRCUIT EFFECTIVE OVER PREDETERMINED INPUT RANGE

Shiro Suzuki, Tokyo, Japan, assignor to Meidensha Electric Mfg. Co., Ltd., Tokyo, Japan

Filed Mar. 26, 1969, Ser. No. 810,760
Claims priority, application Japan, Mar. 29, 1968, Feb. 28, 1969, 43/20624;44/15750
Int. Cl. G05f 1/56, 1/58
U.S. Cl. 323—22 **2 Claims**



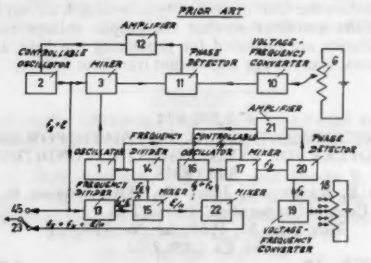
A constant voltage device which is adapted to produce a constant output voltage when variations in an input voltage are within a working range of the device. When the input voltage of the device is out of said working range, the output voltage thereof is reduced to substantially zero.

3,588,676

SIGNAL GENERATOR FOR A NUCLEAR RESONANCE SPECTROGRAPH

Werner Tschopp, Zurich, and Toni Keller, Uster, Switzerland, assignors to Spectrospin A. G., Zurich, Switzerland

Filed Sept. 24, 1968, Ser. No. 761,974
Claims priority, application Switzerland, Sept. 27, 1967, 13526/67
Int. Cl. G01n 27/78
U.S. Cl. 324—0.5 **12 Claims**



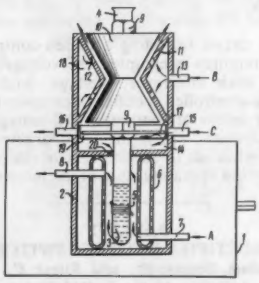
A method and apparatus for generating a linear frequency sweep to obtain high resolution nuclear magnetic resonant spectra in a nuclear magnetic resonant spectrograph. The signal is generated by feeding a signal f_s to a mixer which receives a signal $f_s + \epsilon$ from a controllable oscillator and feeds out a signal κ into a phase detector. The phase detector receives a signal from a potentiometer via a voltage frequency converter, and feeds back a signal through the controllable oscillator via an amplifier. The signal $f_s + \epsilon$ is fed into a circuit including at least one additional potentiometer and voltage frequency converter, and is divided by a factor greater than unity in order to reduce the frequency sweep. The divided signal is then shifted by adding a suitable constant signal f_k to it, so as to put the output signal into the range where nuclear magnetic resonance is obtained.

3,588,677

DEVICE FOR ROTATION OF A THERMOSTATTED SAMPLE

Jury Lvovich Kleiman, Fontanka, 126, Kv. 25; Nikolai Viktorovich Morkovin, Krasnoputilovskaya ulitsa, 53, Kv. 73, and Jury Nikolavevich Jurikov, Fontanka, 172, Kv. 11, Leningrad, U.S.S.R.

Filed May 8, 1969, Ser. No. 823,016
Claims priority, application U.S.S.R., May 15, 1968, 1,240,060
Int. Cl. G01n 27/28
U.S. Cl. 324—0.5 **4 Claims**



A spinner for rotating a sample to be investigated in an NMR probe comprises a thermostatted enclosure and an air-turbine separated by a chamber with an insulating gas and a disc. A rotatable tube holds the sample and extends axially through the enclosure, turbine and chamber, the disc being secured to the tube for rotation therewith. The rotor of the air-turbine is secured to the tube and has, in longitudinal section, the shape of two coaxially arranged truncated cones joined at their narrow bases while the stator of the turbine has an inner surface of a shape complementary to the rotor so that a small space remains between the stator and rotor through which the propelling gas is passed.

3,588,678

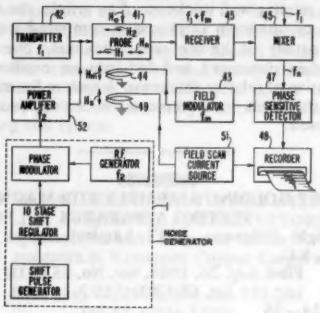
SPECTROMETERS USING AN R.F. NOISE GENERATOR EMPLOYING A CARRIER MODULATED BY A BINARY RANDOM SEQUENCE

Richard R. Ernst, Winterthur, Switzerland, assignor to Vauan Associates, Palo Alto, Calif.

Division of Ser. No. 568,041, July 26, 1966, abandoned. Filed Oct. 22, 1969, Ser. No. 868,430
Int. Cl. G01n 27/78
U.S. Cl. 324—0.5 **9 Claims**

Radiofrequency spectrometer systems employing a radiofrequency noise generator are disclosed. The noise generator includes a radiofrequency generator for generating a radiofrequency carrier signal. A binary data output generator generates a binary random sequence signal. The output of the binary random sequence generator is employed for phase modulating the radiofrequency carrier signal by plus or minus 180° relative phase at the binary random sequence,

whereby the power of the noise output signal of the modulator remains essentially constant with time while producing a broadband high spectral density noise output having a well defined, continuous function power spectrum.

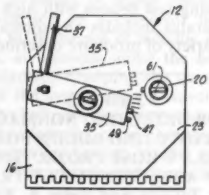


3,588,679

ENGINE IGNITION TESTER INCLUDING AN IGNITION COIL POLARITY INDICATOR

Orrin E. Lewis, 2401 K St., Belleville, Kans.

Filed Nov. 18, 1968, Ser. No. 776,407
Int. Cl. G01m *15/00*
U.S. Cl. 324—17 **1 Claim**



This invention is an ignition tester scope operable to test coils, spark plugs, condensers, and also time the power plant on internal combustion engines normally found on vehicles. More particularly, this invention is an ignition tester scope including a main support assembly, a movable terminal assembly mounted upon the support assembly, and a stationary terminal assembly positioned in cooperating alignment with the movable terminal assembly on the main support assembly usable to visually indicate the spark strength received from the electrical system in a vehicle. Additionally, this invention is an ignition tester scope having means for connecting to existing coil and spark plug wires in an internal combustion engine and electrical contact points movable relative to each other to visually indicate the spark strength therebetween.

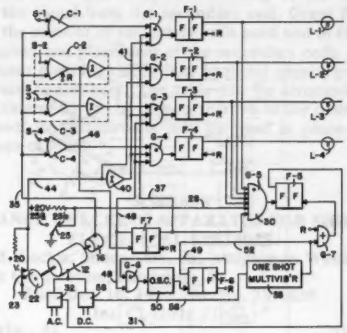
3,588,680

ELECTRONIC TESTING APPARATUS

Stuart E. Athey, Troy, Ohio, assignor to The Hobart Manufacturing Company, Troy, Ohio

Filed Apr. 1, 1968, Ser. No. 717,497
Int. Cl. G01r *31/02*
U.S. Cl. 324—28 **7 Claims**

Rotary switch actuators are tested by connection to testing apparatus having a control to drive the actuator, a switch arranged to be opened or closed by the actuator, a tachometer sensing the speed of operation as the motor drives the actuator at varying speeds, and a comparator circuit is arranged to receive an output from the tachometer and to have one or more inputs preset to values corresponding to tachometer output at predetermined speeds. The comparator circuit output is connected to a gate circuit and the gate circuit also receives an input from the switch, whereby a signal or lack of a signal from the gate circuit output indicates success or failure of an actuator under test to operate the switch within desired speed limits.

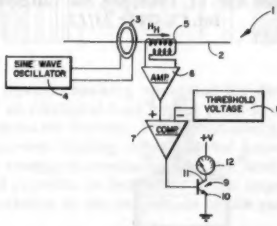


3,588,681

SYSTEM FOR PRODUCING ANALOG SIGNALS PROPORTIONAL TO THE ANISOTROPHY FIELD FOR PLATED WIRE

Glenn W. Murray, Irvine, Calif., assignor to North American Rockwell Corporation, El Segundo, Calif.

Filed June 9, 1969, Ser. No. 831,528
Int. Cl. G01r *33/00*
U.S. Cl. 324—34 **2 Claims**



The wire is magnetized (+ and −) along its longitudinal axis by a field which is large relative to the anisotrophy level of the wire. The resulting change in flux ($d\Phi/dt$) is converted into a pulse having a fixed amplitude and width which is proportional to the anisotrophy field of the wire. The pulse drives a meter calibrated to read the anisotrophy field H_k directly.

3,588,682

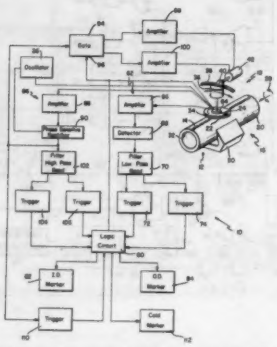
SYSTEM FOR INSPECTING A WELDED SEAM WITH MEANS FOR GENERATING A SIGNAL WHICH IS A FUNCTION OF THE WELDING TEMPERATURE

Friedrich M. O. Forster, Der Schoene Weg 144, 741 Reutlingen, Germany

Filed Nov. 28, 1967, Ser. No. 686,194
Int. Cl. G01r *33/12*
U.S. Cl. 324—37 **10 Claims**

The present invention relates to nondestructive testing and more particularly to means for locating defects in a workpiece, such as welded pipe, determining whether or not the defect is unacceptable and indicating the characteristics and location of such defects. A search unit having a spinning disc or rotor is disposed adjacent the workpiece so as to scan along an inspection area on the workpiece. A first pickup probe on the rotor senses any stray magnetic fields produced by any inside or outside defects, such as cracks, together with means to indicate the size and location of the defect. A second pickup probe on the rotor scans the workpiece and

senses the magnetic fields reradiated from the eddy currents induced in the surface of the workpiece. Means are coupled to the two probes and responsive to the signals therefrom to



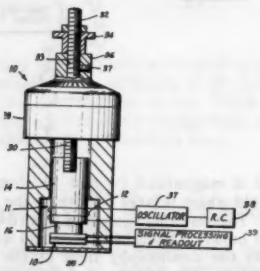
maintain the search unit correctly centered over the inspection area, to determine various characteristics of the workpiece and indicate when unacceptable defects are present.

3,588,683

METHOD AND APPARATUS FOR NONDESTRUCTIVE TESTING OF FERROMAGNETIC ARTICLES, TO DETERMINE THE LOCATION, ORIENTATION AND DEPTH OF DEFECTS IN SUCH ARTICLES UTILIZING THE BARKHAUSEN EFFECT

Donald Lloyd, Houston, Tex., assignor to Gulf Coast Pipe Inspectors, Inc., Houston, Tex.

Filed Apr. 11, 1968, Ser. No. 720,534
Int. Cl. G01r *33/12*
U.S. Cl. 324—37 **13 Claims**



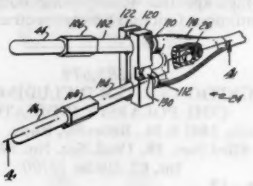
Methods of and systems for use in electromagnetically analyzing ferromagnetic articles wherein a magnetic field having an intensity in which the Barkhausen effect is substantial is induced in the article to be analyzed, and a low-frequency alternating magnetic field is applied to an area of interest of the magnetized article causing the magnetic domain to move. A detector-coil assembly disposed in the vicinity of the low-frequency alternating magnetic field detects the magnetic intensity induced in response to the magnetic field and alternating magnetic field. It has been found that the magnetic intensity in the vicinity of a defective area is of a different magnitude than in the vicinity of a sound area, and this information is useful in determining various parameters of the article. One system makes a quick scan inspection of pipe to determine the presence and general location of defects. In such system, several transversely spaced resonator-detector units longitudinally traverse the pipe and a record is made from each unit. In a system for analyzing a defect, a resonator-detector unit longitudinally traverses the defective area in stepped transverse increments, and the detected magnetic intensity is recorded and later played back and fed into an oscilloscope for pictorial representation and photographing. In a system for analyzing welds, there are several transversely spaced detectors whose output signals are sequentially sampled and recorded. The recording is later fed into an oscilloscope and photographed. In a system measuring the relative wall thickness of an article, the signal from an article of unknown thickness is compared with a signal from an article of known wall thickness. The generated signals, when processed and fed into an oscilloscope, are determinative of relative thickness. A system for making relative wall thickness measurements on a continuous basis is also disclosed.

3,588,684

PROBE HOLDING ASSEMBLY FOR MAGNETIC TESTING APPARATUS

John Dwight Ridgeway, 3517 Admiral Drive, Charleston Heights, S.C.

Filed Aug. 26, 1969, Ser. No. 853,018
Int. Cl. G01r *33/12*
U.S. Cl. 324—38 **1 Claim**



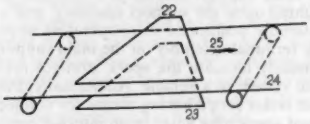
Portable magnetic testing apparatus including a low voltage control circuit for energization of a transformer/rectifier circuit for energizing test probes with high amperage direct current. The apparatus includes an adjustable prod holding assembly, and a variety of prods are described.

3,588,685

DEVICE FOR DETECTING NONMAGNETIC OR MAGNETIC CONDUCTING BODIES FOR CONVEYORS USING COILS WHOSE PROJECTION ON THE CONVEYORS ARE ESSENTIALLY TRAPEZOIDAL

Kai B. Fallenius, Tapiola, and Keijo A. Varmola, Helsinki, Finland, assignors to Outokumpu Oy, Helsinki, Finland

Filed Apr. 5, 1968, Ser. No. 719,189
Claims priority, application Finland, Apr. 10, 1967, 1053/67
Int. Cl. G01r *33/00*
U.S. Cl. 324—41 **12 Claims**



This invention relates to a method and a device for detecting electromagnetically nonmagnetic or magnetic conducting bodies, e.g. metal bodies, from a medium (surrounding material) different from the material of the bodies, applied particularly for detecting magnetic and nonmagnetic metal scrap from belt conveyed magnetic and/or conducting ore or ore product.

The operation of the metal detector according to the invention is based on the different conductivity of ores and metals, by detecting such a component of the secondary field caused by a body in an electromagnetic alternating field, as is small for the ore material but large for metals because of their good conductivity. The detector comprises an audio frequency transmitting system, a receiving system to detect the field caused by the metal bodies, a signal amplifier, a coherent detector which separates a component of certain phase from the signal received and finally a monitor circuitry for the analysis of the signal observed and for the forming of

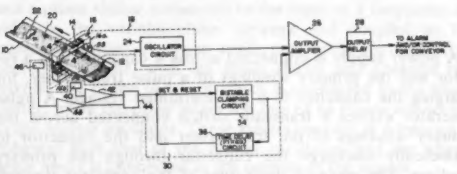
an alarm signal. The transmitter is constructed to produce a field which varies in direction as a function of position in the field so that a detectable signal is received at one point at least of the influence area, irrespective of the shape, direction and position of the body on the belt when the body moves through the influence area of the instrument (usually that of a coil system). The signals caused in the receiving system by the transmitter and the evenly distributed surrounding (ore) material are made zero either by using a bridge connection of the coils or by a suitable construction of the receiving coil system.

3,588,686

TRAMP METAL DETECTION SYSTEM WITH BELT SPLICE AVOIDANCE FOR CONVEYORS

Orson R. Lingmann, Salt Lake City, and Milton O. Gold, Sandy, Utah, assignors to Kennecott Copper Corporation, New York, N.Y.

Filed May 27, 1968, Ser. No. 732,204
Int. Cl. G01r *33/00*
U.S. Cl. 324—41 **12 Claims**



A system for detecting and warning or otherwise reacting to the presence of pieces of tramp metal in ore or other materials being carried on a conveyor belt, without false responses due to the presence of metallic components, such as splice lacings, at intervals along the length of the belt. Means are provided for clamping the tramp metal detector output portion of the system during travel of such metallic components of the belt past the tramp metal sensing portion of the system. The clamping means are triggered by a proximity detector located adjacent to the conveyor belt upstream from the tramp metal sensing portion of the system, and are reset by a second proximity detector located downstream from the tramp metal sensing portion of the system, or by time-delay means. The latter is preferably provided in any event as a safety measure.

The metal sensing portion is preferably an electrical coil constructed to easily fit around an endless conveyor belt.

3,588,687

SENSING COIL ARRANGEMENT FOR A METAL DETECTOR

Hans W. Kohler, Washington, D.C., assignor to the United States of America as represented by the Secretary of the Army

Continuation-in-part of application Ser. No. 717,191, Mar. 29, 1968, now abandoned. This application Nov. 18, 1969, Ser. No. 877,730
Int. Cl. G01r *33/00*
U.S. Cl. 324—41 **7 Claims**

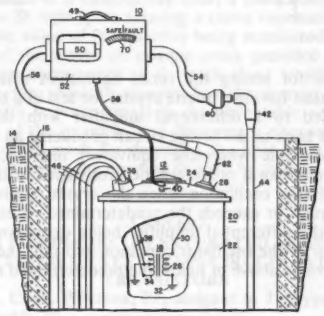
A sensing coil arrangement for a metal detector which has very small voltages induced between any two points of the sensing coil. The coil arrangement is insensitive to hand effects. The coil arrangement comprises a primary coil and a secondary coil which is decoupled from the primary coil and attached to an amplification and sensing device which interprets the signal from the secondary coil. Great flexibility exists in the number of secondary coils used and in the actual configuration and placement of the secondary coils. The coil arrangement gives high sensitivity to metal objects present in the forward hemisphere. The coils can be arranged so that the direction of the metal objects relative to the coils may be determined. Printed circuits may be used in place of multiturn loops of wire.

3,588,688

IMPEDANCE CHECKING APPARATUS FOR SHIELDED ELECTRICAL SYSTEMS

Arthur M. Lockie, Sharpsville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1968, Ser. No. 789,639
Int. Cl. G01r *31/02*
U.S. Cl. 324—51 **10 Claims**



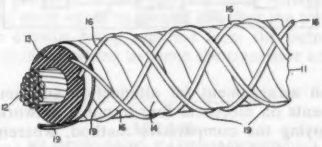
Electrical circuit checking apparatus for determining the condition of an electrical load circuit prior to connecting an energized conductor thereto. The circuit checking apparatus connects a current limiting impedance of known magnitude between the energized conductor and the load circuit to be checked, and provides an indication of the impedance of the load circuit relative to the magnitude of the current limiting impedance.

3,588,689

VARIABLE IMPEDANCE SYSTEM FOR ELECTRICAL CABLE FAULT LOCATING AND TEMPERATURE MONITORING

Harry F. Crawford, R.D. #2, Steinmetz & Mill Roads, Schwenksville, Pa.

Filed June 16, 1969, Ser. No. 833,533
Int. Cl. G01r *31/08*; **G01k** *11/06*
U.S. Cl. 324—52 **8 Claims**



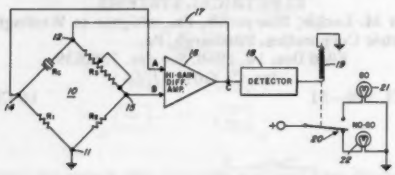
An apparatus is disclosed comprising sensors made of strip conductors covered with a nonconducting thermoplastic envelope which are wrapped helically around the outside metallic shielding tape of an insulated conductor of a pipe-type cable so as to provide, in cooperation with such tape, a uniform capacitance per unit length of cable, as well as a uniform resistance per unit length. Upon occurrence of a

fault, a sensor is either open circuited or caused to contact the shielding tape by the energy dissipated at the fault. A calibrated bridge measurement of the effective capacitance or resistance reveals the distance to and location of the fault.

3,588,690
TEST CIRCUIT INCLUDING BRIDGE TYPE OSCILLATOR MEANS FOR MONITORING EQUIVALENT SERIES RESISTANCE OF QUARTZ CRYSTALS

Hugh Allen Griffin, Fortville, Ind.

Filed July 16, 1969, Ser. No. 842,197
Int. Cl. G01r *29/22*
U.S. Cl. 324—56 **3 Claims**

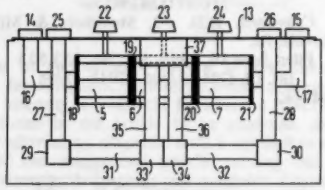


A circuit for testing the series equivalent resistance of quartz crystals having a quartz crystal for test in a bridge circuit coupled to a differential amplifier with the output thereof fed back to the bridge circuit producing an oscillator that will oscillate when the equivalent resistance of the crystal is less than a predetermined resistance in the bridge circuit and stop oscillation when the crystal equivalent resistance equals or exceeds the predetermined resistance, the output of the differential amplifier being operative to drive an indicator of the oscillator condition and thus indicate the resistance value above or below the predetermined resistance value.

3,588,691
CIRCUIT ARRANGEMENT WITH FREQUENCY COMPENSATION FOR ATTENUATION AND AMPLIFICATION MEASUREMENT ON ELECTRICAL QUADRUPOLES

Heinrich Detsch, Planegg, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Sept. 18, 1967, Ser. No. 668,451
Claims priority, application Germany, Sept. 23, 1966, S106080
Int. Cl. G01c *27/00*
U.S. Cl. 324—57 **5 Claims**

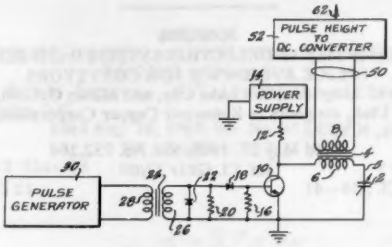


A circuit arrangement for attenuation and amplification measurements on electrical four-terminal networks and the like employing the comparative method, wherein a signal generator having a measuring voltage of constant amplitude and a voltage measuring device can be operatively connected to a measuring branch containing the object to be measured and to a comparison branch containing a precision calibration circuit, in which attenuation means is disposed in the branch not containing the calibration circuit, whose attenuation characteristic responsive to the measuring frequency corresponds to the attenuation characteristic of the precision calibrating circuit when in the zero attenuation position.

3,588,692
CIRCUIT FOR DEVELOPING A PULSE HAVING AN AMPLITUDE DETERMINED BY THE CAPACITANCE OF A CAPACITOR COUPLED THERETO

Oscar H. Koski, Richland, Wash., assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed Feb. 14, 1969, Ser. No. 799,167
Int. Cl. G01r *11/52*
U.S. Cl. 324—60R **1 Claim**

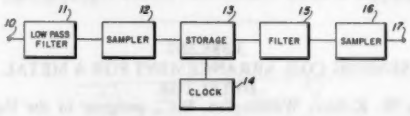


A power supply is connected across a capacitor, via a resistor and the primary windings of a pulse transformer, for charging the capacitor to a predetermined voltage. A pulse generator excites a transistor switch connected across the primary windings of the transformer and the capacitor to periodically discharge the capacitor through the primary windings. The periodic discharges of the capacitor through the primary windings of the pulse transformer induces in the secondary windings output pulses which have an amplitude proportional to the capacitance of the capacitor.

3,588,693
PROPORTIONAL BANDWIDTH FREQUENCY ANALYZER

Robert Halley; Robert J. Bolam, and Carroll W. Marshall, San Diego, Calif., assignors to the United States of America as represented by the Secretary of the Navy

Filed June 9, 1969, Ser. No. 833,245
Int. Cl. G01r *23/16*
U.S. Cl. 324—77B **10 Claims**

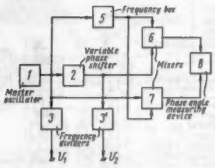


A signal processing method for the real-time analysis of frequency components within an input signal employs low-pass filter means capable of passing at least the highest frequency to be analyzed; the filtered input signals are sampled at a rate equal to or greater than the Nyquist rate for the highest frequency to be analyzed. The sampled signal data is then stored in an appropriate means and the stored data is caused to be repetitively read out at variable rates which are greater than the sampling rate whereby frequency multiplication factors are produced as a function of the instantaneous readout rate and the sampling rate. A fixed bandwidth filter receives the readout data, the center frequency of the filter being equal to the product of the instantaneous frequency being analyzed and the instantaneous multiplication factor. Further sampling means may be arranged to receive the outputs of the fixed bandwidth filter and to operate at a rate which is a function of the variable rate of reading out the stored data for producing sample data within a selected frequency spectrum to be analyzed.

3,588,694
VERY LOW AND LOW-FREQUENCY PRECISION PHASE CALIBRATOR

Svyatoslav Anatolievich Kravchenko, Kirovsky prospekt, 65, KV.29, and Evgeny Dmitrievich Koltik, B. Porokhovskayaul, 54, Korp. 2, KV.77, Leningrad, U.S.S.R.

Filed Oct. 30, 1968, Ser. No. 771,806
Int. Cl. G01r 25/00
U.S. Cl. 324—85 3 Claims

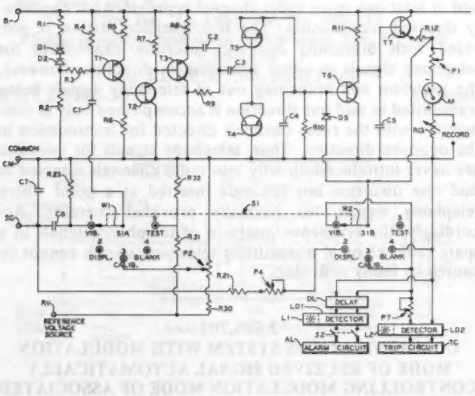


A precision phase calibrator including a master oscillator supplying a variable-phase and a reference-phase network and a phase shifter connected to the input of a frequency divider in the variable-phase network and coupled to the master oscillator. A phase angle measuring circuit is connected in parallel with the phase shifter and contains two mixers, one of the inputs of which is connected to the phase shifter, while the other mixer has one of its inputs connected to the master oscillator. These mixers operate at a frequency coherent with that of the master oscillator, and the phase-angle meter is connected to the outputs of the mixers.

3,588,695
CONDITION MONITORING APPARATUS

Blase J. Furfaro, Berkey, and Donald F. Wilhelm, Toledo, Ohio, assignors to Helm Instrument Company, Inc., Toledo, Ohio

Filed Nov. 13, 1967, Ser. No. 686,373
Int. Cl. G01r 1/00, 19/22
U.S. Cl. 324—111 9 Claims

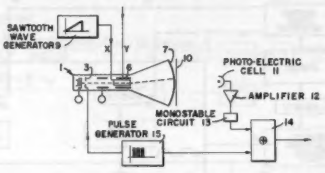


Monitoring apparatus shown in a preferred embodiment as including an input circuit for separating AC and DC components of a signal, a circuit for conditioning the AC component and translating it to DC output signal which is proportional to the peak-to-peak value of the AC component, and various readout means. Means for calibrating the circuit and readouts, and means for limiting transient effects are also disclosed. The preferred embodiment has four modes of operation—actual monitoring, transducer displacement measuring, calibration and testing.

3,588,696
DEVICES FOR MONITORING A PHYSICAL QUANTITY

Jean Solvay, 68, avenue de l'Oiseau Bleu, and Henri Solvay, 296, avenue Moliere, Brussels, Belgium

Filed Oct. 18, 1968, Ser. No. 768,796
Claims priority, application Luxembourg, Nov. 21, 1967, 54,931
Int. Cl. G01r 13/20; H01j 39/12
U.S. Cl. 324—121 15 Claims

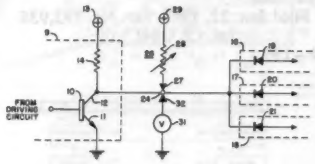


A device for monitoring a physical quantity by producing, on the screen of a cathode-ray tube, a trace composed of a succession of light spots forming a curve representing variations in the value of the quantity being monitored, disposing in front of the screen an opaque mask provided with a slit whose form corresponds to the path along which the trace lies when the physical quantity has the desired value and whose width is proportional to the acceptable variations in the value of the quantity, and disposing a photoelectric cell in front of the mask for detecting the light spots whenever they appear within the opening defined by the slit.

3,588,697
TESTER FOR IN-CIRCUIT SATURATED TRANSISTORS AND METHODS OF TESTING IN-CIRCUIT SATURATED TRANSISTORS

Harold D. Cook, Wheaton, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Sept. 3, 1968, Ser. No. 756,775
Int. Cl. G01r 31/22; H03k 1/00
U.S. Cl. 324—158T 3 Claims



In-circuit testing for collector-emitter short circuits of transistors is achieved by providing a variable impedance probe connected between the collector node of the transistor and a source of operating potential. The impedance of the transistor probe is reduced to a point where the gain of the transistor no longer is sufficient to keep the output in saturation. If the node voltage then rises, the transistor must be functioning properly; if, however, the node voltage does not rise, a direct short exists to ground in either the transistor, in one of the circuits being supplied from the output of the transistor, or in the wiring between the transistor and the circuits.

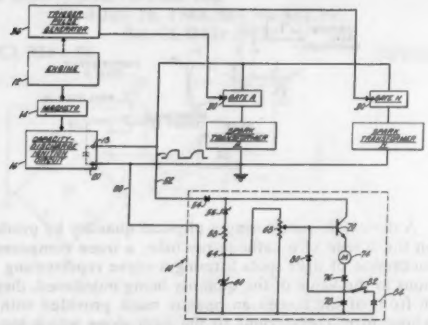
3,588,698
ELECTRONIC TACHOMETER

Joel N. Ashcraft, Columbus, Miss., assignor to AMBAC Industries, Incorporated, Columbus, Miss.

Filed Jan. 2, 1969, Ser. No. 788,451
Int. Cl. G01p 3/48
U.S. Cl. 324—169 3 Claims

An electronic tachometer suitable for producing indications of engine r.p.m. by connecting two leads from the tachometer across a pair of terminals (e.g. in the ignition system of the engine) between which there is generated a se-

ries of voltage pulses recurrent at a rate proportional to engine speed. A Zener-diode clamping circuit derives, from the engine-synchronized voltage pulses, a corresponding series of control pulses having predetermined fixed amplitudes and applies them to the base circuit of a transistor connected in the common-emitter circuit configuration. The emitter load for the transistor is a capacitor, which is charged to a predetermined voltage in response to each engine-synchronized pulse. Between such pulses the capacitor is discharged by way of a diode connected between the capaci-



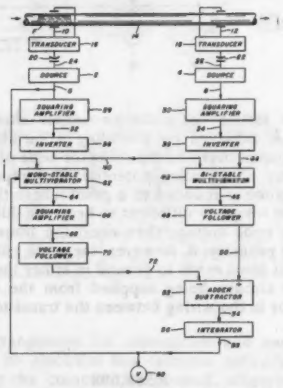
tor and the base of the transistor, so that the discharge path is effectively opened during charging but closed during the discharging interval. A current meter is connected in the charging path for the capacitor, and produces a needle deflection proportional to the average current through it and hence proportional to the rate of operation of the engine. To change the scale factor of the meter, one or more capacitors may be connected in parallel with the original capacitor when lower rates of engine operation are to be indicated. A rectifier in the input lead enables easy calibration by connection to a power line.

3,588,699

CIRCUIT FOR CONVERTING TIME DELAY TO VOLTAGE

Joseph Pysnik, Monroeville, Pa., assignor to United States Steel Corporation

Filed Jan. 22, 1969, Ser. No. 792,935
Int. Cl. G04f *9/00*
U.S. Cl. 324—189 **6 Claims**



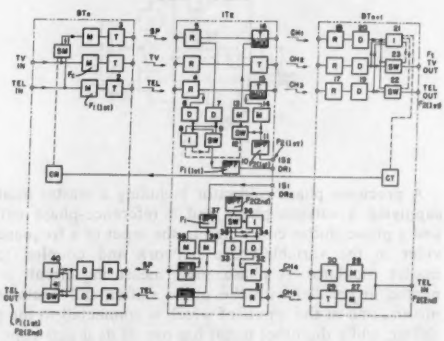
A circuit for converting the time delay between two signals utilizes the first signal to turn on a monostable multivibrator and a bistable multivibrator. The second signal turns off the bistable multivibrator. The difference between the ON times is integrated and fed back to the monostable multivibrator reference input. This changes the monostable multivibrator output towards the level of the bistable multivibrator output. When equilibrium is reached the integrator output is a measure of the time difference between the two signals.

3,588,700

FAILURE COMPENSATING DROP CHANNEL MICROWAVE RADIO RELAY SYSTEM

Haruo Shiki, and Takaaki Taniya, Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo-to, Japan

Filed Mar. 18, 1969, Ser. No. 808,277
Claims priority, application Japan, Mar. 20, 1968, 43/18089
Int. Cl. H04b *7/14;* **H04j** *1/10*
U.S. Cl. 325—2 **8 Claims**



A microwave radio relay system is provided in accordance with the teachings of the present invention wherein the transmission quality of television signals being transmitted in a spare radio channel is maintained and the distortion thereof due to the erroneous insertion of telephony signals therein is completely avoided. In one embodiment of the present invention a microwave radio relay system including first and second baseband terminal stations and at least one leak-insertion station is provided with at least one television signal transmitting radio channel, at least one telephony signal transmitting radio channel and at least one spare radio channel capable of replacing either of said transmitting radio channels upon the detection of a failure therein. Each of said radio channels is directed for transmission in one direction and in addition, at least one telephony signal radio channel and at least one spare radio channel is provided for oppositely directed transmission. The leak-insertion station is provided with branching out and insertion capabilities for telephony signals in either transmission direction; however, the insertion and branching out of telephony signals being transmitted in said one direction is accomplished only in conjunction with the radio channels directed for transmission in the opposite direction. Thus, telephony signals for insertion are never introduced directly into radio channels directed in said one direction but are only inserted at a point where telephony signals are normally provided therefor. Accordingly, the erroneous insertion of telephony signals in a spare radio channel transmitting television signals cannot be caused by faulty switching.

3,588,701

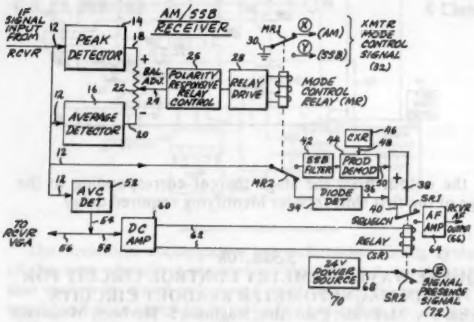
COMMUNICATIONS SYSTEM WITH MODULATION MODE OF RECEIVED SIGNAL AUTOMATICALLY CONTROLLING MODULATION MODE OF ASSOCIATED TRANSMITTER

Leonard R. Kahn, Freeport, N.Y., assignor to Kahn Research Laboratories, Inc., Freeport, N.Y.

Continuation-in-part of application Ser. No. 500,005, Oct. 21, 1965, now Patent No. 3,401,341, dated Sept. 10, 1968. This application Sept. 9, 1968, Ser. No. 758,560
Int. Cl. H04b *1/38*
U.S. Cl. 325—15 **10 Claims**

Communications system involving plural receive/transmit stations, at least some of which are equipped to receive and transmit signals in various signal modulation modes, with at least one station comprising receiver means automatically sensing the modulation mode of a given received transmis-

sion and responsively establishing and maintaining the operating mode of the associated transmitter to transmit in the modulation mode sensed by the receiver. The receiver is also provided with memory circuitry to maintain the operating mode of the transmitter in the modulation mode last sensed by the receiver until an effective signal having another modulation mode is received. Squelch circuitry is also provided to disable the receiver output in the situation where the signal-to-noise ratio of the received signal is below a

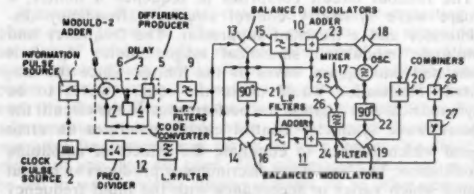


predetermined value. Various types of typical receive/transmit systems are presented, involving differentiation as between amplitude modulation type and single sideband modulation type received signals, between high stability amplitude modulation and high stability single sideband modulation received signals, between amplitude modulation, upper single sideband, and lower single sideband types of received signals, between amplitude modulation and frequency modulation types of received signals, and between single sideband and frequency modulation types of received signals.

3,588,702
TRANSMITTER FOR SINGLE SIDEBAND TRANSMISSION BIVALENT OF PULSE

Felix D. Tisi, Zuerich, and Peter Leuthold, Neuhausen am Rhinefall, Switzerland, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 23, 1968, Ser. No. 786,111
Claims priority, application Netherlands, Jan. 13, 1968, 6,800,578
Int. Cl. H03k 7/00; H04l 27/04
U.S. Cl. 325—38 **8 Claims**

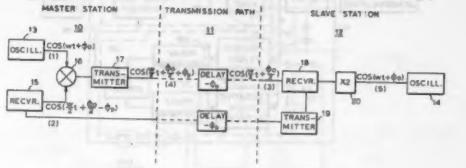


Binary information is transmitted as a single sideband signal to a receiving station. The binary signal is first converted to a three level signal. Phase quadrative versions of this three level signal are produced by using two modulators supplied with 90° relative phase shifted versions of a carrier equal to one quarter of the binary pulse frequency. The phase shifted versions of the three level signal are then each modulated on phase quadrature versions of the transmission frequency carrier and combined for transmission as a single sideband signal. The two carriers are transmitted as a pilot.

3,588,703
PHASE SYNCHRONIZATION SYSTEM

Morris Sorkin, Santa Monica, and Gary Lindstrom, Palos Verdes Estates, Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed May 1, 1967, Ser. No. 635,159
Int. Cl. H04b 1/00
U.S. Cl. 325—58 **9 Claims**

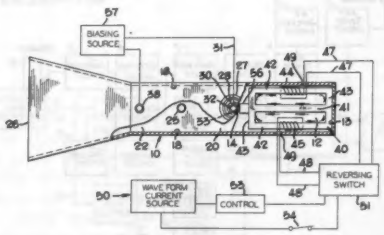


A system for phase synchronizing a first signal generated at a first station with a second signal generated at a second station. The system employs a closed loop in which a phase information signal is transmitted from the first to the second station and then retransmitted from the second station back to the first station. Use of this closed loop technique compensates for transmission path delays and enables phase synchronization between signals locally generated at spaced apart stations.

3,588,704
SWEPT FREQUENCY MICROWAVE GENERATOR

Fred J. Rosenbaum, Clayton, Mo., assignor to Washington University, St. Louis, Mo.

Filed May 22, 1969, Ser. No. 826,869
Int. Cl. H04b 1/04
U.S. Cl. 325—105 **15 Claims**



A compact, lightweight swept frequency microwave oscillator employs an emitting semiconductor device, in a resonant cavity structure formed to polarize emitted waves and to suppress Faraday rotation. Within the cavity structure a ferrite element and a magnetizing coil are used to create flux lines extending longitudinally. Changing the magnetic flux changes the effective inductance and capacitance of the cavity structure, varying the oscillation frequency in a sweep of the X-band.

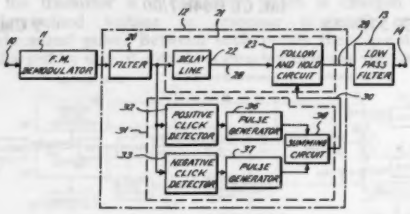
3,588,705
FREQUENCY-MODULATION DEMODULATOR THRESHOLD EXTENSION DEVICE

T. O. Paine, Administrator of the National Aeronautics and Space Administration with respect to an invention of; Frank J. Loch, and William M. Conrad, Houston, Tex.

Filed Nov. 12, 1969, Ser. No. 875,849
Int. Cl. H04b 1/06
U.S. Cl. 325—348 **11 Claims**

A threshold extension device is connected between the output of a frequency-modulation demodulator and the input of the customary demodulator output filter for purposes of minimizing the occurrence of impulse noise, usually referred

to as "click" noise, at the output of the output filter. The device includes a click-eliminating signal transfer channel having a follow and hold circuit. The device also includes amplitude-sensitive click detector circuitry for detecting the occurrence of a click-type noise impulse and switching the follow and hold circuit to the hold condition, whereby the signal transferred to the output filter is held at the last previous nonclick value during the occurrence of the click impulse.

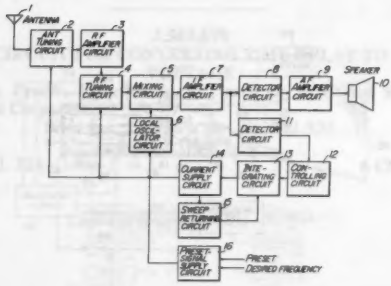


3,588,706

AUTOMATIC TUNING RECEIVER

Yasuhide Sakai, Kawasaki-shi; Yoshinori Takagi, and Masahiro Watanabe, Yokohama, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed July 9, 1968, Ser. No. 743,463
Claims priority, application Japan, July 24, 1967, July 28, 1967, 42/48044;42/65772
Int. Cl. H04b 1/16
U.S. Cl. 325—417 **9 Claims**



An automatic tuning receiver wherein the reactance value of a tuning circuit is varied in accordance with a control signal consisting of a current or voltage to thereby effect tuning control, thus making it possible to easily perform the sweep with respect to a desired broadcast signal.

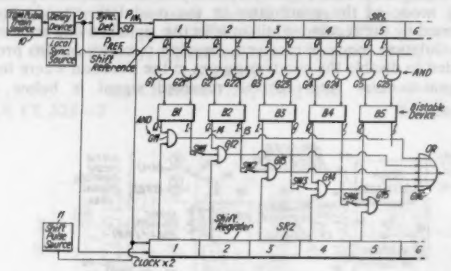
3,588,707

VARIABLE DELAY CIRCUIT

Roger Alan Manship, Stortford, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 30, 1968, Ser. No. 763,871
Claims priority, application Great Britain, Oct. 25, 1967, 48467/67
Int. Cl. H03k 5/159
U.S. Cl. 328—55 **10 Claims**

An automatic variable digital delay circuit to compensate a digital signal for variable delays in networks employing TDM channels. The circuit includes a first shift register in which the sync pulse of the input pulse train is stepped therethrough at a given rate. The output of each shift register stage is gated with a local sync pulse. The stage that is "on" when local sync pulse occurs identifies the delay necessary to achieve sync. This delay is obtained by passing the entire pulse train through a second identical shift register and taking the output from the stage thereof corresponding to the stage of the first shift register identifying required delay.

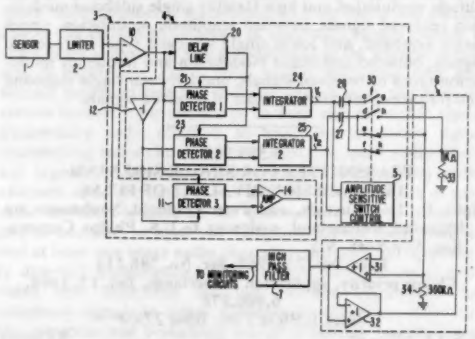


3,588,708

SQUARE WAVE SYMMETRY CONTROL CIRCUIT FOR USE IN MAGNETOMETER READOUT CIRCUITS

Richard A. McBride, Palo Alto; Reginald S. Herbert, Mountain View, and Warren S. Weintraub, Cupertino, Calif., assignors to Varian Associates, Palo Alto, Calif.

Filed Feb. 23, 1968, Ser. No. 707,688
Int. Cl. G01r 33/08; H03k 5/04, 1/14
U.S. Cl. 324—58 **2 Claims**



The readout circuit comprises in sequence a limiter, a square wave symmetry control circuit, a frequency discriminator and a transient suppressor. The frequency and amplitude modulated sinusoidal magnetometer signal is translated into square waves by the limiter. Since the amplitude modulation would cause the square waves to be asymmetrical and degrade the performance of the circuit, the square wave symmetry control circuit generates an error signal which is used to eliminate the effects of amplitude modulation. The frequency discriminator produces an output signal which varies in accordance with the input frequency from the magnetometer. This output signal when plotted against input frequency comprises a ramp or sawtooth, with a period of 1000 Hz., such that the sawtooth repeats for each 1000 Hz increment of input frequency. A second phase detector produces an identical sawtooth output shifted in frequency by 500 Hz. with respect to the first. A logic switch sensitive to the amplitude of each of the sawtooth waves switches the following circuits between the frequency discriminator outputs to avoid signal distortions which develop at the transition points of the sawtooth waves. A transient suppressor prevents transients from saturating the following filter circuits when different DC levels exist on the discriminator outputs at the time of switching. By feeding back the signal being monitored to the output of the unused chan-

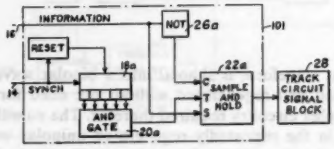
nel of the frequency discriminator, the same signal is forced to be present on both channels when switching takes place.

3,588,709

SYNCHRONOUS TIMING SYSTEM HAVING FAILURE DETECTION FEATURE

Robert C. Hoyler, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 26, 1968, Ser. No. 762,840
Int. Cl. H03k *17/00*
U.S. Cl. 328—63 **6 Claims**



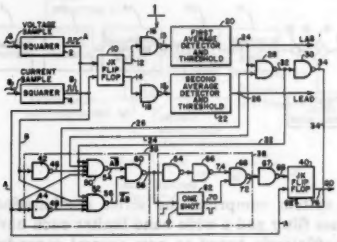
The invention encompasses a synchronous timing system of the type wherein a counter is "slaved" to a synchronization station by count pulses and reset signals. By providing a synchronization signal having one less pulse than the capacity of the counter, and using the absence of the pulse to provide the synchronization intelligence, the system has a built-in feature allowing detection of synchronization failure.

3,588,710

DIGITAL PHASE DETECTION CIRCUITRY

Harvey M. Masters, Ellicott City, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 5, 1968, Ser. No. 750,137
Int. Cl. H03b *3/04*
U.S. Cl. 328—133 **9 Claims**



A sensitive, digital, phase-detection circuit incorporating a phase-error threshold. The circuit converts two sinusoidal samples of voltage and/or current into digital form and inspects their phase relationships. An output indicates the phase error direction and notifies an external circuit whenever the phase difference exceeds a predetermined value. No adjustments are required, even though input levels and operating frequencies may vary over wide ranges. No digital clocks of any type are used. The information detected may be fed to servo systems, display systems, or to other control devices. Micrologic elements may be advantageously used.

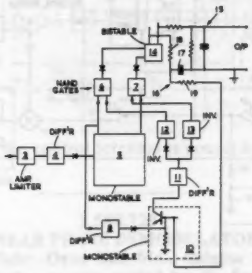
3,588,711

FREQUENCY DISCRIMINATORS

Eugeniusz Antoszewski, Stafford, England, assignor to The English Electric Company Limited, London, England

Filed Apr. 21, 1969, Ser. No. 817,738
Claims priority, application Great Britain, Apr. 23, 1968, 19161/68
Int. Cl. H03b *3/04*
U.S. Cl. 328—140 **7 Claims**

A frequency discriminator comprises a first monostable responsive to input signals of two different frequencies and operable to develop one output for conditioning a first coincidence gate during its unstable period and another output to condition a second coincidence gate during its stable period. A second monostable is triggered-on by a first monostable and a common pulse is developed therefrom to condition both the first and the second gates upon this second



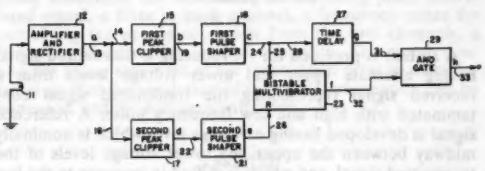
monostable switching from its unstable to its stable state. With this arrangement the first gate produces an output in response to the input signals effecting a frequency change in one sense whilst the second gate produces an output in response to a frequency change in the other sense.

3,588,712

TWO LEVEL WEAK SIGNAL DETECTING CIRCUIT

Tadashi Uozumi, New York, N.Y., assignor to Fujitsu Limited, Kawasaki, Japan

Continuation-in-part of application Ser. No. 420,994, Dec. 24, 1964. This application Aug. 2, 1968, Ser. No. 757,183
Int. Cl. H03k *5/153*, *17/00*
U.S. Cl. 328—150 **7 Claims**



An input circuit detects an input signal at first and second determined magnitude levels different from each other to produce first and second pulses spaced from each other by a time interval. One of the first and second pulses is absent when the input signal is a weak signal having a magnitude between the first and second levels. An indicating circuit connected to the input circuit indicates the absence of one of the first and second pulses spaced from the other by the time interval.

3,588,713

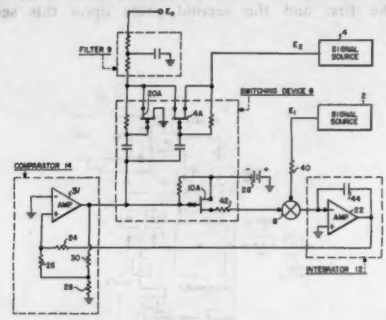
MULTIPLIER CIRCUIT

Michael J. Yareck, Staten Island, N.Y., assignor to The Bendix Corporation

Filed Sept. 4, 1968, Ser. No. 757,237
Int. Cl. G06g *7/16*
U.S. Cl. 328—160 **7 Claims**

A multiplier including operational amplifiers for providing an oscillator which generates an output having a sawtooth waveform with a duty cycle proportional to a first input signal. A switch controlled by the sawtooth output gates a second input signal with the same duty cycle providing a

pulse having an amplitude corresponding to the second input signal and a duty cycle proportional to the first input signal.



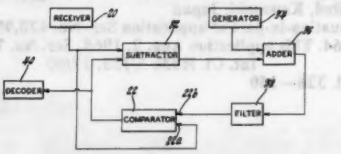
The switch output is filtered for providing a signal proportional to the product of the first and second input signals.

3,588,714

SYSTEM FOR RECONSTRUCTING A DIGITAL SIGNAL

Duane E. McIntosh, Palmyra, Wis., assignor to General Motors Corporation, Detroit, Mich.

Filed June 30, 1969, Ser. No. 837,776
Int. Cl. H03k *1/04*
U.S. Cl. 328—164 **4 Claims**



A system is provided for reproducing a transmitted signal having alternate upper and lower voltage levels from a received signal representing the transmitted signal contaminated with high and low frequency noise. A reference signal is developed having a voltage level which is nominally midway between the upper and lower voltage levels of the transmitted signal, and which is shifted in response to the low frequency noise within the received signal. A local signal is produced having the upper voltage level when the voltage level of the received signal is above the voltage level of the reference signal, and having the lower voltage level when the voltage level of the received signal is below the voltage level of the reference signal. The local signal duplicates the transmitted signal.

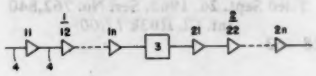
3,588,715

REGENERATIVE REPEATERED TRANSMISSION APPARATUS

Takao Matsushima, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo, Japan

Filed Jan. 22, 1969, Ser. No. 793,095
Claims priority, application Japan, Jan. 24, 1968, 43/3719
Int. Cl. H03k *5/156*
U.S. Cl. 328—164 **5 Claims**

Regenerative repeatered transmission apparatus is provided according to this invention wherein the repeater means present therein may be substantially reduced in size, cost and power consumption due to the collective elimination of accumulated jitter induced in a series of such repeater means and the adoption of a code format which does not require a timing function in each of the repeater means present therein. According to one embodiment of the present invention, the waveform transmitted through the transmission path of the regenerative repeatered transmission apparatus is unipolar in form and takes one of two discrete values alternately for each selected code bit of the original pulse codes. Upon receipt of the unipolar waveform at a given repeater means,



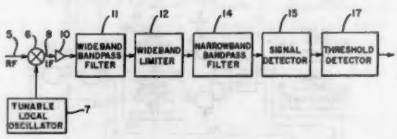
the input waveform is shaped into a bipolar waveform, discriminated and regenerated without the need for timing or the complex circuitry required therefor. The cumulative jitter present in the repeatedly regenerated unipolar waveform is collectively removed by jitter compression means inserted in said regenerative repeatered transmission apparatus after each N repeater means.

3,588,716

METHOD AND APPARATUS FOR DETECTING WHEN THE SPECTRUM OF A PULSE SIGNAL IS CENTERED IN THE PASSBAND OF A RECEIVER

Elbert L. Turner, San Jose; James P. Rapoza, Santa Clara, and Claude A. Jackman, San Jose, Calif., assignors to Sylvania Electric Products, Inc.

Filed Aug. 20, 1969, Ser. No. 851,590
Int. Cl. H03b *1/00*
U.S. Cl. 328—167 **9 Claims**



This system comprises the series combination of a first band-pass filter and a wide band limiter each having a bandwidth sufficiently broad to pass several secondary lobes of the spectrum of an input pulse, and a second band-pass filter having a passband that is centered in the limiter passband and is broad enough to pass only one secondary lobe of the pulse spectrum. The output signal of the second filter is detected and applied to a threshold device. The limiter normalizes the amplitude of the strongest lobe in the passband thereof to be a limiting level that is greater than a prescribed threshold level. When the amplitude of the second filter output signal exceeds the threshold level, the output signal of the threshold detector indicates that the center frequency of the input pulse is centered in the passband of the limiter.

3,588,717

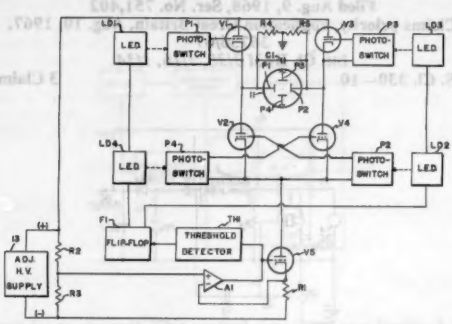
BEAM SCANNER WITH DEFLECTION PLATE CAPACITANCE FEEDBACK FOR PRODUCING LINEAR DEFLECTION

Stanley Harrison, Bedford, Mass., assignor to KEV Electronics Corp., Wilmington, Mass.

Filed June 23, 1969, Ser. No. 835,580
Int. Cl. H01j *29/74, 39/12;* **H03k** *4/12, 4/50*
U.S. Cl. 328—229 **21 Claims**

In the beam scanner disclosed herein, a capacitance which includes the capacity between a pair of beam deflection plates is charged at a constant rate by a feedback current

supply thereby to obtain a substantially linear scanning of the beam. When the deflection plate voltage reaches a



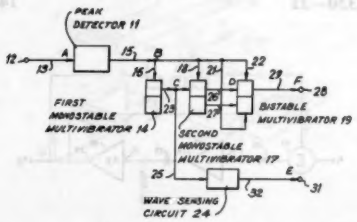
preselected level, the direction of application of the applied current is reversed so as to reverse the scan.

3,588,718

DISCRIMINATOR CIRCUIT FOR SEPARATING BINARY DATA SIGNALS AND CLOCK SIGNALS FROM A MODULATED BINARY DATA SIGNAL

Mitsuo Oiso, Kawasaki-shi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation-in-part of application Ser. No. 592,181, Nov. 4, 1966. This application Jan. 9, 1970, Ser. No. 1,620
Int. Cl. H03k 9/04
U.S. Cl. 329—104 **8 Claims**



A peak detector derives peak pulses separated by time intervals subject to variation from a modulated binary data signal. Binary data signals are detected and separated from the modulated binary data signal. Clock signals are detected and separated from the modulated binary data signal. A control operated by the peak pulses controls the operation of each of the data and clock deriving circuits and comprises a time varying circuit for varying the time position of the clock signals to overcome variations in the time intervals between the peak pulses.

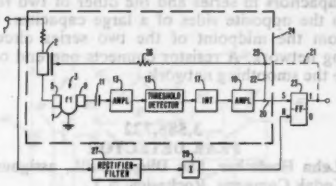
3,588,719

FREQUENCY DETECTOR CIRCUIT UTILIZING AN ELECTROMECHANICAL TUNED FILTER

Paul Abramson, Yorktown Heights, and Lawrence W. Emerson, Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 16, 1968, Ser. No. 783,928
Int. Cl. H03k 9/00
U.S. Cl. 329—105 **19 Claims**

A frequency detection system for detecting the frequency of tone signal bursts is provided with a controlled damping arrangement to limit the resonant buildup of the tuned frequency device employed therein. Damping is implemented through utilization of a three terminal signal controlled variable impedance device, such as an FET device, wherein the variable impedance path is coupled in series with the input to



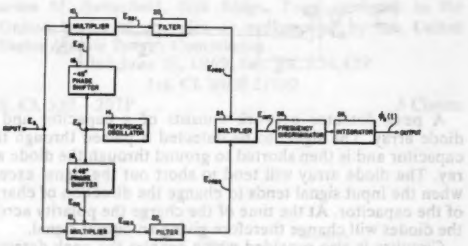
the system and the control terminal is coupled to the output of the system.

3,588,720

LINEAR PHASE DEMODULATOR

Frederick R. Fluhr, Oxon Hill, Md., assignor to the United States of America as represented by the Secretary of the Navy

Filed Mar. 5, 1969, Ser. No. 804,572
Int. Cl. H03d 3/18
U.S. Cl. 329—124 **1 Claim**



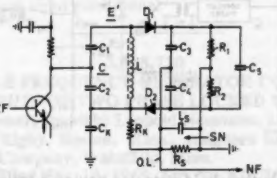
A phase demodulator including a dual channel quadrature phase modulator for modulating an incoming phase modulated signal, a filter in each channel, a frequency mixer for combining the processed signals from the two channels, a frequency discriminator, and an integrator. The circuit doubles the phase argument of the input signal prior to demodulation so that the resolution of the phase information can be increased, and the accuracy enhanced.

3,588,721

DEMODULATOR FOR FREQUENCY MODULATED SIGNALS

Hans Keller, and Fritz Lowel, Freiburg, Germany, assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

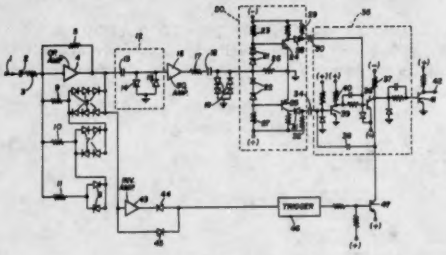
Filed May 2, 1969, Ser. No. 821,425
Claims priority, application Germany, May 4, 1968, P 17 66 326.2
Int. Cl. H03d 3/10
U.S. Cl. 329—129 **3 Claims**



A ratio detector arrangement in which the usual transformer with tuned primary and secondary, is replaced by a tuned L-C circuit with the C consisting of two capacitors connected in series and the input applied between them. A

smaller capacitor by a factor of 10 connects one end of the L-C circuit to ground. In a conventional manner the opposite ends of the L-C circuit are connected via two oppositely poled diodes respectively across two circuits, one consisting of two capacitors in series and the other of two resistors in series, to the opposite sides of a large capacitor. Output is taken from the midpoint of the two series circuits via a smoothing network. A resistor connects one end of the L-C circuit to the smoothing network.

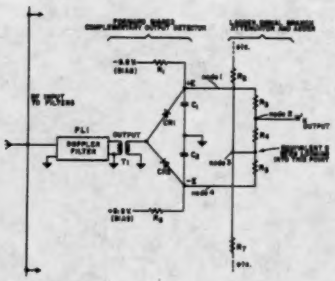
3,588,722
PEAK DETECTOR
Robert Lehn Hoelscher, San Diego, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Jan. 31, 1969, Ser. No. 795,583
Int. Cl. H03d 1/10
U.S. Cl. 319—204 **2 Claims**



A peak detector network consists of a capacitor and a diode array. The signal to be detected is passed through the capacitor and is then shorted to ground through the diode array. The diode array will tend to short out the signal except when the input signal tends to change the direction of charge of the capacitor. At the time of the charge the polarity across the diodes will change therefore giving an output signal.

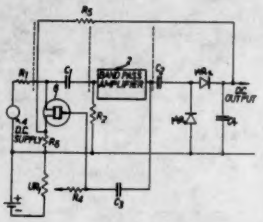
Circuitry is also provided which enables the peak detector to handle signals having a wide range of amplitudes. Further circuitry is provided to give uniform rectangular wave output regardless of the height or polarity of the input. Also provided is a trigger arrangement which disables the output circuitry for any signal which falls below a given level.

3,588,723
ENSEMBLE THRESHOLD DETECTOR
William F. Butler, Los Angeles, Calif., assignor to the United States of America as represented by the Secretary of the Navy
Filed Oct. 1, 1969, Ser. No. 862,752
Int. Cl. H03d 1/10
U.S. Cl. 329—204 **3 Claims**



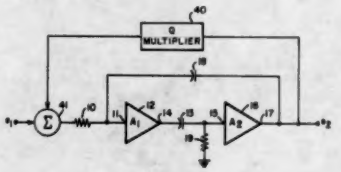
An ensemble threshold detector having a resistance ladder that joins a plurality of detectors to produce a weighting or averaging function to yield a smoothed estimate of the mean output for each detector which output is amplified by a circuit associated with each detector and used as a detection threshold for that detector output.

3,588,724
DC AMPLIFIERS
Gordon Rex Boughton, Rugeley, England, assignor to Thorn Automation Limited, Rugeley, England
Filed Aug. 9, 1968, Ser. No. 751,402
Claims priority, application Great Britain, Aug. 10, 1967, 36736/67
Int. Cl. H03f 3/38, 3/16, 1/34
U.S. Cl. 330—10 **3 Claims**



A circuit arrangement for DC amplifying systems in which the DC input is combined with an AC input in a modulator so as to produce a chopped DC or modulated AC input for amplification by an AC amplifier, the output of the AC amplifier being connected to the AC input of the modulator, the parameters of said circuit arrangement being adjusted so as to determine the frequency of the signal fed to the alternating signal input terminal of the modulator.

3,588,725
Q-INVARIANT ACTIVE RESONATOR
Philip R. Geffe, Laurel, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed May 27, 1969, Ser. No. 828,170
Int. Cl. H03f 3/04
U.S. Cl. 330—21 **14 Claims**

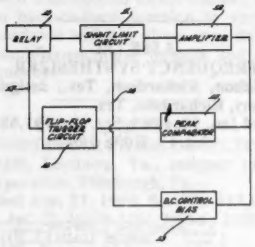


An RC-amplifier resonator having a pole Q which is uniquely invariant under passive element drift. Shifts of filter response with temperature have been minimized without destroying the usefulness of the resonator as a building block for electrical band-pass filters. The two-amplifier resonator has a voltage gain of $-(4Q^2-1)$. The magnitudes of the resistors are equal to each other as are the magnitudes of the capacitances. For a normalized center frequency at unity the resistance magnitudes are unity and the capacitance magnitudes are 1/2Q, or 2Q for the inverse network.

3,588,726
AUDIO PEAK LIMITER AND PEAK SWITCHING CIRCUIT
Wallace J. Kabrick, Plainville, Ill., assignor to Harris-Intertype Corporation, Cleveland, Ohio
Filed Sept. 10, 1968, Ser. No. 758,822
Int. Cl. H03g 3/30
U.S. Cl. 330—29 **12 Claims**

A limiter and peak phase switching circuit having a pair of transistors coupled in shunt with an input transformer and performing the function of a controlled variable impedance element to limit the output of the network. A negative and positive peak detector senses the absolute magnitude of the negative going and positive going portions of the audio signal and through the use of a field effect transistor and a flip-flop circuit, switches the polarity of the input terminals of the net-

work to avoid excessive negative modulation. The output of the positive and negative peak detectors are rectified and utilized to develop a control signal which is then coupled to the input circuit of a pair of transistors used as the variable



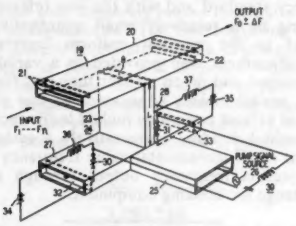
impedance element. This control signal acts as a feedback to yield the required limiting action. The limiter includes means for asymmetrically limiting the positive and negative peaks by altering the bias applied to a pair of diode detectors.

3,588,727

IMAGED IMPEDANCE THROUGH FREQUENCY CONVERSION

Harold Seidel, Warren Township, Somerset County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Dec. 13, 1968, Ser. No. 783,512
Int. Cl. H03f *3/12*
U.S. Cl. 330—34 **9 Claims**



This application describes the manner in which a frequency converter can be used as a bridge between different frequency domains. In particular, a frequency converter is used to image low frequency circuit components at a higher frequency, thereby producing circuit responses at the higher frequency that could not ordinarily be produced directly. For example, a relatively moderate Q resonant circuit is imaged at a higher frequency with a Q that is increased by the frequency transformation ratio. A negative resistance diode is imaged at a higher frequency thereby producing amplification at a frequency at which such a diode could not normally operate.

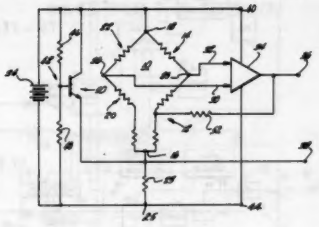
3,588,728

IMPEDANCE BRIDGE TRANSDUCER CIRCUITS

Shmuel Elazar, Camarillo, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Sept. 12, 1968, Ser. No. 759,434
Int. Cl. H03f *1/02, 5/00*
U.S. Cl. 330—69 **3 Claims**

A bridge-type transducer and amplifier circuit for providing a high level output signal is energized from a common source of excitation voltage. A differential amplifier is connected to the bridge for producing an output signal between an output terminal thereof and a reference terminal maintained at a predetermined reference voltage level. Means connected across the source of excitation voltage and to a reference terminals maintains the reference terminal at said voltage level, and can include a Zener diode or an emitter



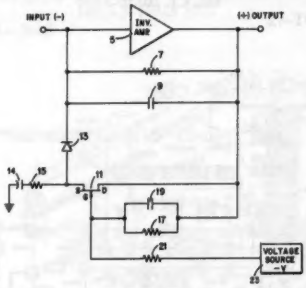
follower to provide a low output impedance for the reference terminal.

3,588,729

NONBLOCKING PREAMPLIFIER

Marion M. Satterfield, Oak Ridge, Tenn., assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed June 18, 1969, Ser. No. 834,429
Int. Cl. H03f *21/00*
U.S. Cl. 330—207P **3 Claims**



An improved preamplifier for nuclear pulse amplifiers has been provided which does not saturate when presented with an overload pulse. A field effect transistor circuit functions to greatly reduce the preamplifier discharge time constant and cancel the input charge under overload conditions but is nonoperative otherwise, thereby reducing the dead-time under overload input conditions.

3,588,730

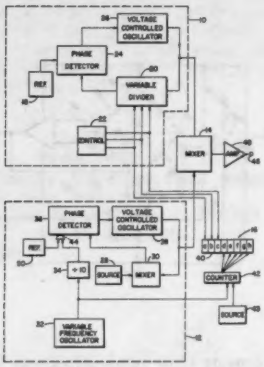
VARIABLE FREQUENCY GENERATOR COMBINING OUTPUTS OF TWO PHASE LOCKED LOOPS

Walter Schreuer, Ipswich; Leopold Neumann, Lexington, and Sherman Rigby, Boston, Mass., assignors to Gordon Engineering Company, Wakefield, Mass.

Filed Nov. 10, 1969, Ser. No. 875,265
Int. Cl. H03b *3/04*
U.S. Cl. 331—2 **11 Claims**

In a precision radio frequency signal generator, an output from a digitally controlled phase locked frequency synthesizer loop is mixed with an output from a tunable phase

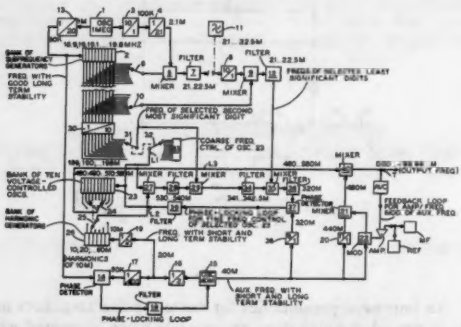
locked variable frequency oscillator loop to provide a range of accurate frequency RF signals. The signal generator is provided with a display wherein the frequency of the signal is presented by an indicator.



3,588,731
AUDIO TO UHF FREQUENCY SYNTHESIZER INCLUDING A PLURALITY OF PHASE-LOCKED OSCILLATORS

Herbert Hoeffer, Grafing; Herbert Knirsch, Erding-Klettham, and Siegfried Rehm, Stockdorf, Germany, assignors to Schlumberger overseas Messgeratebau und Vertrieb GmbH, Munich, Germany

Filed Jan. 17, 1969, Ser. No. 791,991
Claims priority, application Germany, Jan. 20, 1968, P 16 16 327.2
Int. Cl. H03b *3/04*
U.S. Cl. 331—2 **13 Claims**

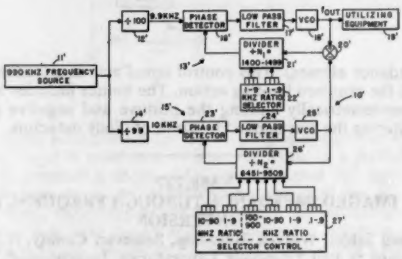

BANK OF FREQUENCY GENERATORS
FREQ. WITH GOOD LONG TERM STABILITY
FREQS. OF SELECTED LEAST SIGNIFICANT DIGITS
FREQ. OF SELECTED SECOND MOST SIGNIFICANT DIGIT
COARSE FREQ. CTRL. OF OSC. 23
MIXER
FILTER
BANK OF TEN VOLTAGE-CONTROLLED OSCS.
BANK OF HARMONIC GENERATORS
FREQ. WITH SHORT AND LONG TERM STABILITY
FEEDBACK LOOP FOR STABILIZATION OF AUX. FREQ.
AUX. FREQ. WITH SHORT AND LONG TERM STABILITY
PHASE DETECTOR
PHASE-LOCKING LOOP

A frequency synthesizer provides a plurality of selectable values of signal frequencies ranging from low audio to UHF having good short- and long-term stability. The synthesizer includes a basic oscillator for generating a good long-term stabilized frequency, an auxiliary oscillator phase-locked with the basic oscillator for generating a good short- and long-term stabilized auxiliary frequency, and a plurality of voltage-controlled oscillators in phase-locked relationship with said auxiliary frequency for producing different selectable frequencies which correspond to the selected values of signal frequencies. The frequency corresponding to the most significant value of the selected frequency is obtained by mixing a frequency from an appropriate selected one of the voltage-controlled oscillators with a submultiple harmonic of the auxiliary frequency. Frequencies of intermediate and lower orders of significance are obtained from various subfrequency generating stages and are mixed with the frequency derived from the selected voltage-controlled oscillator to provide a phase-locked control voltage for fine frequency adjustment of that oscillator. An output mixing stage mixes the frequency of the finely-adjusted selected oscillator with a frequency derived from said auxiliary frequency to provide an output frequency of selected values having good short- and long-term stability.

3,588,732
FREQUENCY SYNTHESIZER

Robert D. Tollefson, Richardson, Tex., assignor to Collins Radio Company, Richardson, Tex.

Filed Jan. 16, 1969, Ser. No. 791,686
Int. Cl. H03b *3/04*
U.S. Cl. 331—2 **18 Claims**

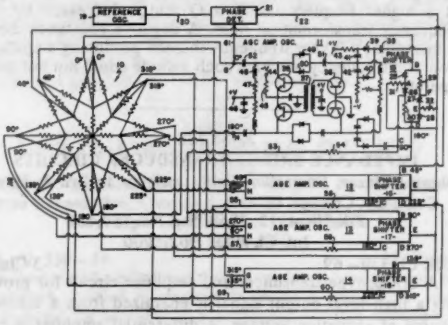


A frequency synthesizer producing an output signal variable through predetermined uniform frequency steps of relatively small incremental value having two fixed input reference frequencies generated from, generally, a higher single frequency standard and with the two reference frequencies differing by a relatively small quantitative frequency value equal to the smallest uniform incremental value frequency adjustment step provided in a variable injection frequency output and much smaller than any frequency step adjustment available with adjustment of one phase locked loop alone of at least two phase locked loops each with selectively controlled dividers cooperatively together providing the resultant small incremental value frequency steps in the variable injection frequency output through an extended frequency range for utilizing equipment.

3,588,733
MULTIPHASE VOLTAGE CONTROLLED OSCILLATOR

Rex J. Crookshanks, Palos Verdes, and Don G. Roberts, Glendale, Calif., assignors to the United States of America as represented by the Secretary of the Navy

Filed Oct. 31, 1969, Ser. No. 872,480
Int. Cl. H03b *3/04, 27/00*
U.S. Cl. 331—2 **5 Claims**



A multiphase voltage controlled oscillator having a resistance matrix coupled at input points to the outputs of automatic gain controlled amplifier-oscillators and at output

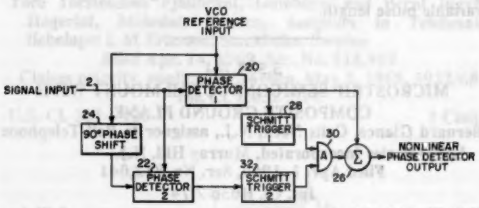
points to phase shifting networks, the phase shifting network outputs being coupled to the amplifier-oscillators to provide regenerative feedbacks and produce a plurality of phase related voltages. The automatic gain controlled amplifiers are differential amplifiers to provide two phase outputs 180° apart and the phase shifters include back-to-back Varicaps as capacitance with a controlled direct current DC imposed at their common back-to-back junction to vary the capacity thereof in accordance with any phase error detected between one of the amplifier-oscillator outputs and a single phase reference frequency.

3,588,734

NONLINEAR PHASE DETECTOR

George R. Welti, Leesburg, Va., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 21, 1969, Ser. No. 817,919
Int. Cl. H03b 3/04; H03d 13/00
U.S. Cl. 331—12 **10 Claims**



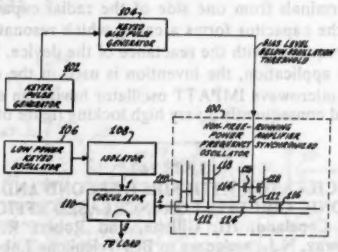
Phase responsive circuitry wherein a nonlinear response to phase error is obtained by providing first and second phase detectors, each for comparing the phase of an input to a reference signal with triggering means responsive to the output of each phase detector. The first triggering means provides a large positive level output and a large negative output when its input is positive and negative, respectively. A second triggering means enables a gate to pass the output from said first triggering means to a summing circuit whereby the output from said phase responsive circuitry is nonlinearly increased for phase errors exceeding a predetermined difference.

3,588,735

UHF OR L BAND NONFREE-RUNNING AVALANCHE DIODE POWER AMPLIFYING FREQUENCY SYNCHRONIZED OSCILLATOR

Kern K. N. Chang, Princeton; Hans John Prager, Belle Mead, and Sherman Weisbrod, Trenton, N.J., assignors to RCA Corporation

Filed June 5, 1969, Ser. No. 830,652
Int. Cl. H03b 7/14; H03f 3/10
U.S. Cl. 331—47 **6 Claims**



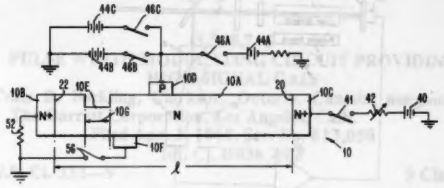
An avalanche diode in cooperative relationship with a UHF or L band wave tuning structure amplifies low power oscillations at a frequency in the UHF or L band applied to the wave tuning structure, if the avalanche diode is biased with a bias level slightly below the threshold value at which free running oscillations take place.

3,588,736

THREE-TERMINAL BULK NEGATIVE RESISTANCE DEVICE OPERABLE IN OSCILLATORY AND BISTABLE MODES

James C. McGroddy, Putnam Valley, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1969, Ser. No. 837,832
Int. Cl. H03b 7/00; H03k 3/31
U.S. Cl. 331—47 **12 Claims**



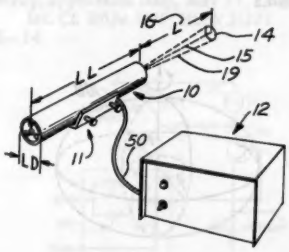
The negative resistance circuit includes a body of N-type gallium arsenide having an excess carrier concentration (n_o) and length (l) such that the body exhibits bulk negative differential conductivity but does not inherently produce travelling high field domains. A P-type contact is made between the first region and cathode to form a second region of high resistance. The P contact is selectively biased to cause a high field to shift between the second region and a third region between the first region and anode. The shifting between regions is controlled by the bias to produce either high frequency oscillations or bistability.

3,588,737

THERMALLY STABILIZED LASER

Ken Tang Chow, Portola Valley, Calif., assignor to Electro Nuclear Laboratories, Inc., Menlo Park, Calif.

Filed Apr. 22, 1968, Ser. No. 723,354
Int. Cl. H01s 3/02
U.S. Cl. 331—94.5 **2 Claims**



A laser is disclosed having an imperforate tubular body which in one embodiment is disclosed as having a composition including asbestos with a low thermal coefficient of expansion and a low thermal coefficient of transmission of heat, and in another embodiment is disclosed as a multiwall metal imperforate body having an airtight space between the two walls. In operation the laser plasma tube stabilizes at a higher temperature than the prior art units with a perforated body, but a translation (pointing stability) of 0.0001 inches/13 inches/hour can be achieved.

3,588,738

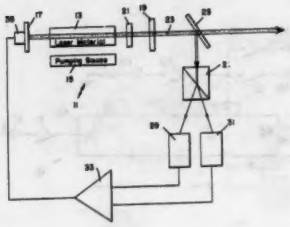
FREQUENCY STABILIZED LASER

Francis E. Goodwin, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Sept. 3, 1968, Ser. No. 756,779
Int. Cl. H01s 3/02
U.S. Cl. 331—94.5 **1 Claim**

The invention is a frequency stabilized laser in which an active laser element and a birefringent plate are disposed

within a regenerative cavity in a regenerative path defined between two end reflectors to produce a dual polarized output beam. The active laser element is excited by pump energy and a portion of the laser output beam is diverted by a beam splitter to a Wollaston prism where it is separated according to polarization into two beams. Each of these beams is directed to an optical detector which detects the amplitude of the incident beam at its own particular frequency of oscillation. The amplitudes of the two beams are compared by a comparator that produces an error signal which drives a frequency adjustment element coupled to the laser.



3,588,739

EXCITER DEVICE FOR SOLID-STATE LASER

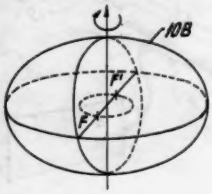
Shogo Yoshikawa, and Ryuji Tatsumi, Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Filed Jan. 28, 1969, Ser. No. 794,618

Claims priority, application Japan, Feb. 2, 1968, Feb. 27, 1968, July 26, 1968, Nov. 16, 1968, 43/83676, 43/6608, 43/12412, 43/53197

Int. Cl. H01s 3/09

U.S. Cl. 33—94.5 **4 Claims**



A laser exciter device is described which utilizes an ellipsoidally-shaped hollow reflector. Within the hollow of the reflector a light source and a lasing material are selectively placed to provide a high irradiation efficiency of the lasing material by the light source. Several embodiments are shown. Each of the embodiments locates the lasing material and light at a selective spacing from and parallel to a major axis of the ellipsoidal structure.

3,588,740

PULSED GAS ION LASER

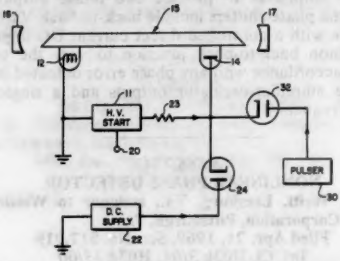
William E. Bell, Jerome, Ariz., assignor to the United States of America as represented by the Secretary of the Army

Filed Apr. 14, 1969, Ser. No. 837,978

Int. Cl. H01s 3/09

U.S. Cl. 331—94.5 **2 Claims**

An arrangement for pulsing a gas ion laser at relatively high pressure by superimposing upon a steady current sufficient to establish ion discharge in the positive resistance region but below the laser threshold, a high current pulse of variable pulse length.



3,588,741

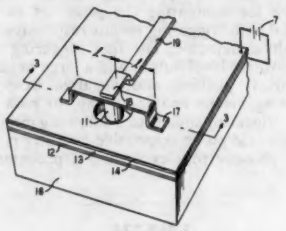
MICROSTRIP SEMICONDUCTOR MOUNT WITH COMPOSITE GROUND PLANE

Bernard Glance, Colts Neck, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

Filed Apr. 1, 1969, Ser. No. 812,041

Int. Cl. H03b 7/14

U.S. Cl. 331—96 **5 Claims**



The present invention is a new form of microstrip mount for two-terminal semiconductor devices. Its elements include first: a large radial capacitor which acts as a DC connector and an RF decoupler between a DC bias source and one such device, and also acts as a composite ground plane for the RF signal generated in the device; and second: an adjustable conductive bridge which provides a DC path to one of the device terminals from one side of the radial capacitor and through the capacitor forms a cavity which resonates at the desired frequency with the reactance of the device. In one illustrative application, the invention is used in the construction of a microwave IMPATT oscillator having an extremely low Q and consequently a very high locking figure of merit.

3,588,742

LSA OSCILLATOR WITH FIRST, SECOND AND THIRD HARMONIC CIRCUITS FOR INCREASED EFFICIENCY

John A. Copeland, III, Gillette, and Robert R. Spiwak, Piscataway, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

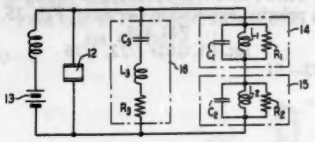
Filed May 5, 1969, Ser. No. 821,637

Int. Cl. H03b 7/06, 7/14

U.S. Cl. 331—96 **20 Claims**

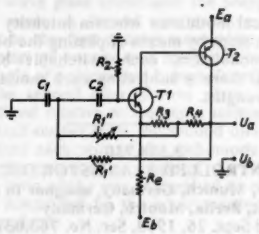
The efficiency of an LSA oscillator is increased by adding a second harmonic component to the voltage across the diode and a third harmonic component to the diode current, preferably by adding an external parallel resonant circuit

resonant at the second harmonic frequency and a series resonant circuit resonant at the third harmonic frequency. In one



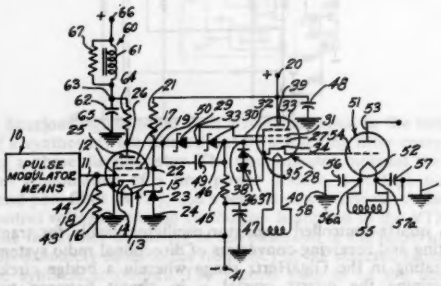
microwave circuit implementation, the LSA diode is mounted in an appropriately designed waveguide iris.

3,588,743
VARIABLE FREQUENCY TRANSISTOR R-C FEEDBACK OSCILLATOR
Tore Torstensson Fjallbrant, Goteborg, and Bernt Ingvar Hagerlof, Moindal, Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden
Filed Apr. 14, 1969, Ser. No. 815,959
Claims priority, application Sweden, May 2, 1968, 5922/68
Int. Cl. H03b *5/24*
U.S. Cl. 331—108 **1 Claim**



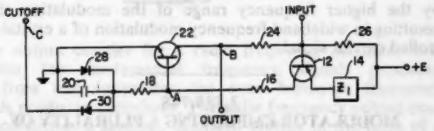
There is disclosed an inductorless oscillator utilizing only two capacitors, a transistor and a plurality of resistors in a feedback path. By making one of the resistors variable the frequency of oscillation can be changed without changing the harmonic distortion of the oscillator.

3,588,744
AMPLITUDE COMPENSATED PULSE DURATION MODULATOR
Hilmer I. Swanson, Quincy, Ill., assignor to Gates Radio Company, Quincy, Ill.
Continuation of application Ser. No. 526,611, Feb. 10, 1966. This application Nov. 7, 1969, Ser. No. 871,541
Int. Cl. H03k *7/00*; **H03b** *1/00*
U.S. Cl. 332—9 **4 Claims**



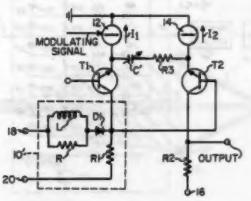
An amplitude compensated pulse duration modulator including a pulse duration modulation system having means for compensating for the effect of stray capacitance at the amplification stages by means of amplitude modulating the pulse duration modulated signal. The amplitude modulated pulse modulated signal is applied to the grid of an amplifier means and the operation of the amplifier means is established such that the amplifier is driven into saturation for all pulses except comparatively smaller area pulses of the pulse train. Accordingly, the pulse train retains a modulation effect only for the smaller area pulses thereby allowing the amplitude modulation to compensate for the reactance effect of the amplifier on the smaller pulses only.

3,588,745
PULSE WIDTH MODULATING CIRCUIT PROVIDING HIGH SIGNAL GAIN
Colin D. Hickling, Clarkson, Ontario, Canada, assignor to The Garrett Corporation, Los Angeles, Calif.
Filed Apr. 3, 1969, Ser. No. 813,058
Int. Cl. H03h *7/08*
U.S. Cl. 332—9 **9 Claims**



A circuit for providing a series of output pulses, the width of which is related to the DC level of an applied input, is disclosed. High, very stable voltage gain is provided in a circuit which utilizes only two transistors as the active elements.

3,588,746
WIDEBAND SOLID STATE FREQUENCY MODULATOR WITH LINEAR CHARACTERISTICS
Agostino Luna, and Roberto Cafissi, Milan, Italy, assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.
Filed Apr. 7, 1969, Ser. No. 813,925
Claims priority, application Italy, May 31, 1968, 17180/68
Int. Cl. H03c *3/00*; **H03k** *3/281*
U.S. Cl. 332—14 **2 Claims**

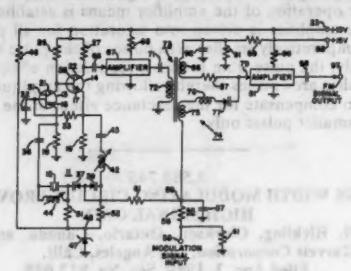


A linear frequency modulator employing a high frequency transistorized multivibrator, the coupling capacitor of which is linearly charged and discharged by a pair of constant current generators, the output of one of which is varied by the modulating signal. The linearity of the modulation characteristics is improved by providing in the collector circuit of one of the multivibrator transistors a linearization network including a resistor and an inductor connected in parallel with each other and in series with a diode.

3,588,747
WIDEBAND COMPOSITE FREQUENCY MODULATOR
Frank W. Rusho, Liverpool, N.Y., assignor to General Electric Company
Filed Oct. 16, 1968, Ser. No. 768,003
Int. Cl. H03c *3/28*
U.S. Cl. 332—26 **4 Claims**

A wideband composite frequency modulation system is disclosed, in which a crystal oscillator is frequency modulated

primarily by the lower frequency range of the modulation signal and the resulting signal is phase modulated primarily



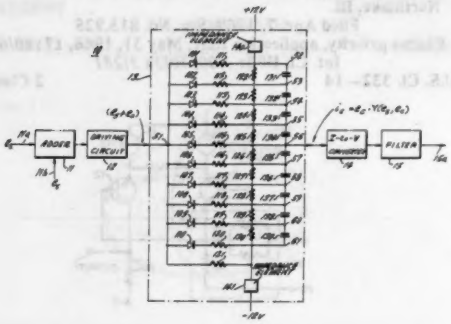
by the higher frequency range of the modulation signal, resulting in wideband frequency modulation of a crystal-controlled carrier signal.

3,588,748

MODULATOR EMPLOYING A PLURALITY OF UNIDIRECTIONAL ADMITTANCE CIRCUITS FOR GENERATING A PIECEWISE LINEAR APPROXIMATION OF THE DESIRED MODULATION CURVE

Masao Inaba; Harunobu Nakamura, and Mineo Mizukami, Tokyo-To, Japan, assignors to Nippon Electric Company, Limited, Tokyo-to, Japan

Filed Oct. 17, 1968, Ser. No. 768,405
Claims priority, application Japan, Oct. 19, 1967, 42/67340
Int. Cl. H03c *1/12*
U.S. Cl. 332—44 **7 Claims**



A circuit for performing amplitude modulation of a carrier signal by a modulating signal. The carrier and modulating signal are first summed and then applied to the input of the modulator circuit which is comprised of a plurality of branch circuits, each having unidirectional impedance elements which are selectively rendered conductive in accordance with the instantaneous value of the input signal applied to the modulator for developing a current signal at the output of the modulator which is a predetermined function of the instantaneous value of the signal, the curve of said function being determined by the respective admittance values of the impedance elements employed in the modulator circuit.

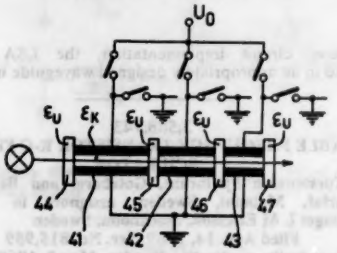
First and second modulator circuits may be combined in a single circuit to provide for amplitude modulation and carrier wave suppression, or alternatively, four such modulator circuits may be used in combination to provide a high quality electronic resolver circuit for synthesizing orthogonally modulated vectors.

3,588,749

DIGITAL OPTICAL MODULATOR

Herbert Meyer, Konig-Heinrich Weg, Germany, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Feb. 26, 1968, Ser. No. 708,278
Claims priority, application Germany, Feb. 25, 1967, P41,495
Int. Cl. G02f *1/22, 1/26*
U.S. Cl. 332—51 **11 Claims**



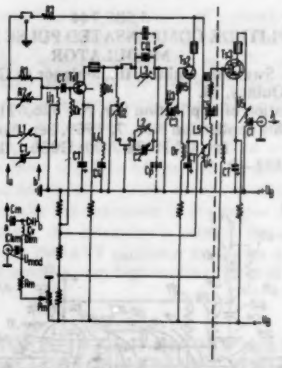
A digital optical modulator wherein intensity of radiation may be varied in steps by means of passing the beam through two separate modulators, each switchable between two operating points, thereby subjecting each modulator to two different field strengths.

3,588,750

QUARTZ-CONTROLLED TRANSISTOR OSCILLATOR

Wolfgang Ulmer, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin, Munich, Germany

Filed Sept. 26, 1968, Ser. No. 763,031
Claims priority, application Germany, Sept. 26, 1967, P 15 91 553.4
Int. Cl. H03b *5/38*
U.S. Cl. 332—30V **33 Claims**



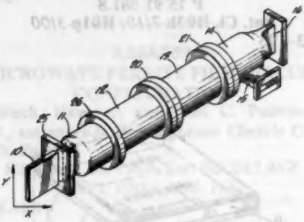
A quartz-controlled transistor oscillator usable for transmitting and receiving converters of directional radio systems operating in the GigaHertz range wherein a bridge circuit containing the quartz crystal is in circuit between two transistors, and a feedback path between the transistors includes a network shifting the phase in dependence on the oscillating frequency of the quartz.

3,588,751

HIGH POWER MICROWAVE POWER DIVIDER

T. O. Paine, Administrator of the National Aeronautics and Space Administration with respect to an invention of Richard B. Kolbly, Barstow, Calif.

Filed Oct. 6, 1969, Ser. No. 864,097
Int. Cl. H01p 5/12
U.S. Cl. 333—6 6 Claims



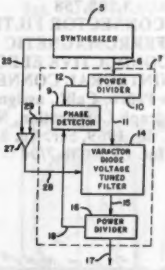
A microwave power divider is disclosed wherein microwave energy at a fixed rectangular waveguide input terminal is supplied in variable ratios to a pair of rectangular waveguide output ports of a fixed output orthomode transducer. The energy into the rectangular waveguide input terminal is transduced to the TE_{11} mode in a mode change transducer connected to the input rectangular waveguide. A first quarter-wave plate transduces the energy to a circular polarization mode. A second quarter-wave plate, rotatable with respect to the first quarter-wave plate, transduces the circularly polarized energy to a rotatable linear polarization mode, the angle of polarization being a function of the rotary setting of the second quarter-wave plate. The orthomode transducer, fixed relative to the input terminal, receives the linear polarized output from the second quarter-wave plate. The power into each port of the orthomode transducer is a function of the polarization angle of the linearly polarized energy. The ratio of the power supplied to each output port is therefore controlled by the rotary setting of the second quarter-wave plate.

3,588,752

TRACKING FILTER

Edward Hirshfield, San Jose, Calif., assignor to Sylvania Electric Products Inc.

Filed Aug. 28, 1969, Ser. No. 853,733
Int. Cl. H03h 7/10
U.S. Cl. 333—17 1 Claim



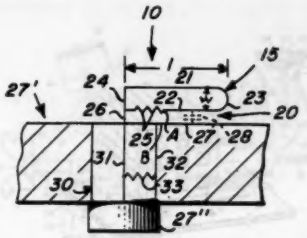
Spurious signals other than a selected signal in the output of a synthesizer are filtered out by a tracking filter comprising a phase discriminator. The discriminator includes the series combination of a first power divider, a voltage tuned band-pass filter (VTF), and a second power divider. A linear control voltage from the synthesizer is applied to the VTF to tune the center frequency of the passband of the latter to be approximately equal to the frequency of the selected signal in the synthesizer output. The second outputs of the power dividers are combined in a phase detector to produce an error voltage that is applied to the VTF to tune the center frequency of the passband thereof to be equal to the selected frequency.

3,588,753

OUTPUT COUPLER FOR A RADIO FREQUENCY OSCILLATOR

Harry H. Shimizu, Mountain View, Calif., assignor to Kruse Electronics

Filed Sept. 15, 1969, Ser. No. 857,754
Int. Cl. H01p 1/16; H03h 7/42
U.S. Cl. 333—21R 23 Claims



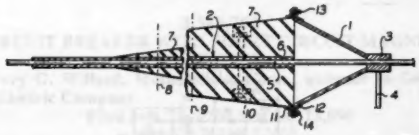
An output coupler for a radio frequency oscillator that couples the fundamental frequency signals produced therefrom and suppresses the even harmonic frequency signals produced therefrom. The radio frequency output coupler comprises a shorted, balanced section in the form of a closed loop and an opened, unbalanced section in the form of an opened loop. The opened and closed loops are respectively quarter wave length lines at the highest frequency signal desired. Distributed capacitance across the opened loop to ground with the leakage of the closed loop forms a section to reduce the power of the even harmonic signals. Thus, the fundamental frequency signals are coupled, while the even harmonic signals are rejected.

3,588,754

ATTACHMENT OF SURFACE WAVE LAUNCHER AND SURFACE WAVE CONDUCTOR

Theodore Hafner, 1501 Broadway, New York, N.Y.

Continuation-in-part of application Ser. No. 587,611, Oct. 18, 1966, now abandoned. This application Apr. 21, 1969, Ser. No. 817,959
Int. Cl. H01p 1/16, 3/10; H01q 13/06
U.S. Cl. 333—21 6 Claims



The invention essentially consists of providing a substantially continuous transition of the wave of the launcher to the wave of the line by surrounding the line when emerging from the launcher with a preferably lowloss dielectric of relatively large diameter corresponding to the diameter of the launcher, which is gradually decreased while extending over the line of the diameter of the dielectric coating of the line itself.

3,588,755

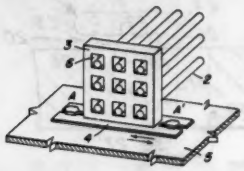
METHODS AND APPARATUS FOR MAKING WIRE TYPE ULTRASONIC DELAY LINES

Kunio Sawada; Yuzo Matsuda, and Hiroshi Kuwabara, Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Filed Nov. 25, 1968, Ser. No. 778,454
Claims priority, application Japan, Dec. 3, 1967, 42/77490
Int. Cl. H03h 9/30
U.S. Cl. 333—30R 9 Claims

Methods and apparatus for assembling ultrasonic delay lines of the type wherein a wire transmission medium is

coiled upon a plurality of supporting blocks are provided in accordance with the teachings of the instant invention. The plurality of supporting blocks are disposed at suitable intervals along the coiled transmission wire and a plurality of slots are provided in each support block for accepting individual portions of the transmission wire. In addition, each of the plurality of supporting blocks is formed so that it is movable in the radial direction of the coiled transmission wire. After the transmission wire has been wound upon the support



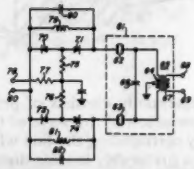
blocks, each support point within a given supporting block may be adjusted in a single stroke for optimum placement of the individual portions of the transmission wire within their associated slots by displacing the supporting block a predetermined amount in the radial direction of the coiled transmission wire. Each support point associated with a given supporting block will require substantially the same adjustment due to the inequality existing between the natural radius of curvature of the transmission wire and the winding radius of curvature relied upon.

3,588,756

CRYSTAL FILTER CIRCUIT

Byron D. Roylance, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Apr. 5, 1966, Ser. No. 540,416
Int. Cl. H03h *9/00*
U.S. Cl. 333—72 **9 Claims**



1. A circuit for rapidly dissipating residual electrical energy stored by a piezoelectric crystal filter due to pulsed signals impressed thereon comprising:

an inductive reactance having a value substantially equal to the capacitive reactance of the electrostatic capacitance of the crystal in the filter at the crystal resonant frequency;

switch means disposed for effecting conduction through said inductive reactance in circuit with said crystal filter; and

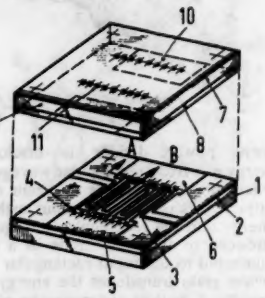
control means for synchronously operating said switch means to effect said conduction between pulses of said signals impressed upon said crystal filter.

3,588,757

MICROWAVE FILTER UTILIZING MULTIPLATE TECHNIQUE IN WHICH DIELECTRIC COATINGS ARE APPLIED TO METAL PLATES

Ernst Andrascek, and Erich Rosshaupter, Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Oct. 10, 1968, Ser. No. 766,513
Claims priority, application Germany, Oct. 12, 1967, P 15 91 581.8
Int. Cl. H03h *7/10;* **H01p** *3/00*
U.S. Cl. 333—73 **7 Claims**



A microwave circuit employing multiplate technique in which two plates of dielectric material each carry on one side thereof a continuous metal layer and on the other side conductor tracks forming microwave circuit elements, with such plates being superimposed with their sides carrying such conductor tracks in opposed relation, and compression forces applied thereto, characterized by the dielectric being in the form of a relatively thin coating on one side of respective relatively thick metal plates and the conductor tracks being disposed the outer face of the respective dielectric coatings, the respective plates and associated dielectric coatings having perforations extending therethrough, the walls of the apertures being coated with a metallic layer extending from selected conductor tracks to the associated metal plate to conductively connect the same.

3,588,758

ELECTRICAL CONNECTOR FILTER HAVING DIELECTRIC AND FERROMAGNETIC TUBES BONDED TOGETHER WITH CONDUCTIVE ELECTRODE LAYERS AND HAVING NONINTEGRAL CONNECTING SPRING

Douglas J. Hurst, San Pedro, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Apr. 28, 1969, Ser. No. 819,692
Int. Cl. H03h *7/04*
U.S. Cl. 333—79 **1 Claim**

The disclosure relates to an electrical connector filter assembly formed of a first tubular member made of a high dielectric constant material such as barium-titanate. The tubular member is conductively coated by means of a silver frit such as silver particles together with microscopic glass beads, which is readily applied to the dielectric tubular member. Further, a second tubular member, made of ferromagnetic

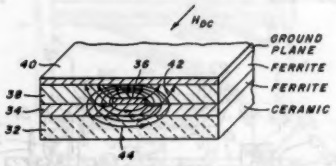
material is also coated by means of a silver frit on its inner surface and around its ends. The ferromagnetic member is inserted in the dielectric member and the entire assembly fired to form a single complete assembly. A spring pin may be placed between a terminal pin and the silver surface inside the ferromagnetic member to aid the terminal pin in contacting the silvered surface. The filter may be readily removed from the terminal pin and replaced with a different filter when desired.

3,588,759

MICROWAVE FERRITE FILM CIRCUIT CONFIGURATION

Daniel C. Buck, Hanover, and Noel C. Peterson, Severna Park, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 17, 1969, Ser. No. 842,462
Int. Cl. H01p 3/08, 1/32
U.S. Cl. 333—84 5 Claims



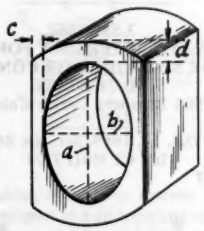
Described is microwave miniaturized signal processing circuitry for radar and the like applications employing ferrite films capable of effecting a phase shift in wave energy passing through the circuitry, and wherein the insertion loss of the device is minimized. This is accomplished by providing a structure wherein the wave energy need not pass through a ceramic or the like substrate, but rather is confined essentially within the ferrite material itself.

3,588,760

SEMIRIGID ELLIPTICAL WAVEGUIDE

Lewis A. Bondon, 90 Yantacaw Brook Road, Upper Montclair, N.J., and David L. Bondon, Northgate Apts. 107K, One Mile Road, Cranbury, N.J.

Filed Nov. 7, 1967, Ser. No. 681,179
Int. Cl. H01p 3/14
U.S. Cl. 333—95 6 Claims



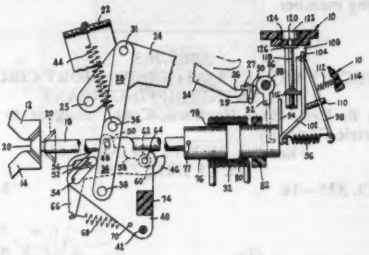
A flexible radio frequency transmission line of the waveguide-type consisting of a waveguide structure of semirigid conductive material having a uniform longitudinal profile whose interior cross section is defined by an ellipse and whose exterior cross section is defined by the intersection of a circle and rectangle, the rectangular sides being parallel to the major diameter of the ellipse and transitioning at both ends into sectors of the circle.

3,588,761

ELECTRIC CIRCUIT INTERRUPTER WITH MAGNETIC TRIP LEVEL ADJUSTING MEANS

Eldon B. Heft, West Hartford, and Keith W. Klein, Simsbury, Conn., assignors to General Electric Company

Filed Feb. 26, 1970, Ser. No. 14,305
Int. Cl. H01h 77/10
U.S. Cl. 335—16 20 Claims



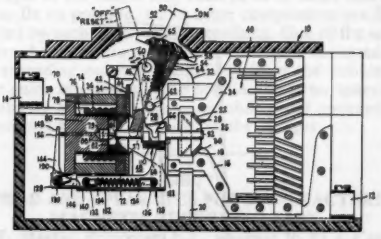
An electrical circuit interrupter has a movable contact carried by a contact operating member for movement relative to stationary contacts between closed and open circuit positions. Operating means will move the operating member from closed to open circuit position upon release of latching means engaged therewith. The contact operating member carries an armature which is subject to the magnetic attraction of a solenoid coil so as to be movable to open circuit position upon passage of a short circuit current of predetermined magnitude therethrough. A second armature also acted upon by the magnetic field of the solenoid coil is movable into a circuit opening position upon passage through the solenoid coil of a lesser short circuit current and acts upon the latching means during such movement to release the operating means for automatic operation thereof. The biasing force acting upon the second armature and which must be overcome by the solenoid force for tripping may be precisely adjusted and the air gap between the second armature and solenoid coil may also be adjusted without varying the biasing force by means of a pair of pivotably interconnected adjustment levers which are pivotable as an assembly to vary the air gap.

3,588,762

CIRCUIT BREAKER WITH SHORT CIRCUIT MAGNETIC TRIPPING MEANS

Henry G. Willard, Wethersfield, Conn., assignor to General Electric Company

Filed Feb. 25, 1970, Ser. No. 13,890
Int. Cl. H01h 77/10
U.S. Cl. 335—16 9 Claims



An electrical circuit interrupter has a movable contact carried by a contact operating member for movement relative to stationary contacts between closed and open circuit positions. A coupling member moves the operating member from closed to open circuit position upon release of latching

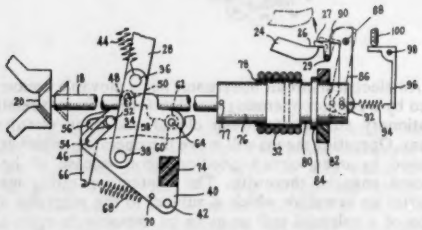
means engaged with a stored energy device which is engageable with the coupling means. The contact operating member carries an armature which is subject to the magnetic attraction of a solenoid coil so as to be movable to open position upon passage of a short circuit current of predetermined magnitude therethrough. The coupling member releases the operating member upon movement of the armature toward the open circuit position as the result of solenoid attraction. Most advantageously, the circuit interrupter includes at least two poles, and the movable contact of the second pole is moved to its open circuit position by movement of the coupling member.

3,588,763

CIRCUIT BREAKER WITH LOW SHORT CIRCUIT MAGNETIC TRIPPING MEANS

Eldon B. Heft, West Hartford, Conn., assignor to General Electric Company

Filed Feb. 26, 1970, Ser. No. 14,453
Int. Cl. H01h *77/10*
U.S. Cl. 335—16 **14 Claims**



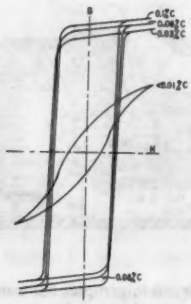
An electrical circuit interrupter has a movable contact carried by a contact operating member for movement relative to stationary contacts between closed and open circuit positions. Operating means will move the operating member from closed to open circuit position upon release of latching means engaged therewith. The contact operating member carries an armature which is subject to the magnetic attraction of a solenoid coil so as to be movable to open circuit position upon passage of a short circuit current of predetermined magnitude therethrough. A second armature also acted upon by the magnetic field of the solenoid coil is movable into a circuit opening position upon passage through the solenoid coil of a lesser short circuit current and acts upon the latching means during such movement to release the operating means for automatic operation thereof.

3,588,764

MAGNETIC ALLOY AND DEVICES UTILIZING SAME

Karl M. Olsen, Madison, and Raymond C. Stoffers, Newark, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Nov. 26, 1969, Ser. No. 880,278
Int. Cl. H01h *51/28*
U.S. Cl. 335—154 **7 Claims**



Alloys having the nominal composition in weight percent 30 percent cobalt, 15 percent chromium, 5 percent manganese, 0.05 percent carbon, remainder iron, when cold worked to an area reduction of at least 50 percent and annealed at a temperature of 500° to 650° C. for a time of from one minute to 10 hours, exhibit a square hysteresis loop, medium coercive force, and high residual induction, enabling their use in a variety of magnetic devices such as bistable switches and memories.

ERRATUM

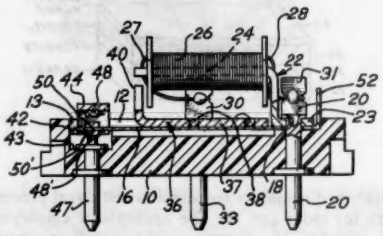
For Class 335—196 see:
Patent No. 3,588,780

3,588,765

ELECTROMAGNETIC RELAYS

Ralph W. Alten, Detroit, Mich., assignor to Essex International, Inc., Fort Wayne, Ind.

Continuation-in-part of application Ser. No. 728,477, May 13, 1968, now abandoned. This application Aug. 19, 1968, Ser. No. 786,512
Int. Cl. H01h *9/30*
U.S. Cl. 335—203 **16 Claims**



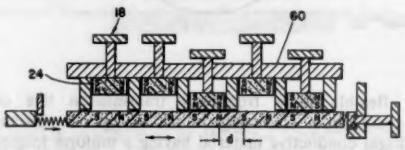
Electromagnetic relays include a base member, coil, a core extending through the coil, a leaf spring, and an armature staked to the leaf spring and moveably responsive to the magnetic field of the coil core produced by the coil. The base member is recessed and a moveable contact is carried by the leaf spring or armature and is adapted to engage a stationary contact located either above or below the moveable contact in the recess in response to the current flow condition through the coil. In a second embodiment a second pair of leaf springs are provided carrying the moveable contacts, the second leaf springs being actuated by a rigid arm attached to the armature and its leaf spring. The contacts are located closely adjacent the magnetic circuit formed by the core and armature, the magnetic flux at the contacts being substantially increased to effect magnetic blowout at the contacts.

3,588,766

ARRANGEMENT, PREFERABLY FOR OPERATING CONTACTS FOR SWITCHING OR CONTROL DEVICES AND THE LIKE

Max Baermann, 506 Bensberg Bezirk Cologne (Rhine), Germany

Filed Oct. 17, 1969, Ser. No. 867,210
Int. Cl. H01f *7/04*
U.S. Cl. 335—207 **15 Claims**



Control apparatus having a plurality of pushbuttons which may be individually moved to an actuated position, held there by magnetic attraction and simultaneously released to

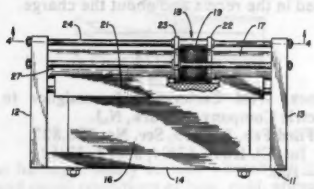
the nonactuated position. The pushbuttons are held in the nonactuated position by magnetic attraction to a fixed supporting member. They are held in the actuated position by magnetic attraction of magnetic poles associated with the pushbuttons for like spaced but opposite polarity magnetic poles on a second member which is movable to a second position to bring magnetic poles of like polarity into opposition and repel the pushbuttons to the nonactuated position.

3,588,767

SERVOMOTOR SHUTTLE GUIDE ASSEMBLY

Ernest M. Haas, Indianapolis, Ind., assignor to Esterline Corporation, New York, N.Y.

Filed Feb. 13, 1969, Ser. No. 799,035
Int. Cl. H01t 7/00
U.S. Cl. 335—209 **6 Claims**



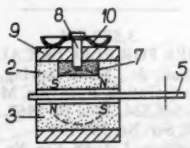
A recording instrument has a servomotor with a shuttle-type of armature supported on bearings slidable freely on a pair of guide rods parallel to a magnetic pole piece coaxial with the armature coils. The pole piece and guide rods are supported at their ends in the side bars of a magnet frame. The guide rods are placed in tension by nuts at opposite ends thereof, threadedly received thereon and having spherical noses seated in countersinks in the side bars to avoid inducing any bow in the guide rods.

3,588,768

ADJUSTABLE MAGNETIC BRAKING SYSTEM

Max Baermann, 506 Bensberg Wulfshof Bezirk Cologne, Germany

Continuation-in-part of application Ser. No. 732,131, May 27, 1968. This application May 7, 1969, Ser. No. 830,561
Int. Cl. H01f 7/08
U.S. Cl. 335—225 **20 Claims**



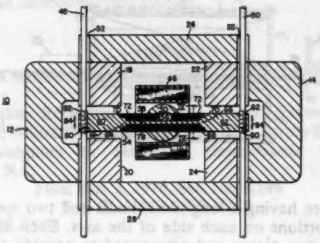
A magnetic braking system for electric meters having at least one braking magnet and an adjusting magnet contiguous to the braking magnet which can be moved with respect to the braking magnet to adjust the magnetic flux in an airgap. The braking magnet is fixed between the end members of a U-shaped carrier body to form the airgap and may have a recess in which the adjusting magnet is positioned. The braking magnet is magnetized with two or more poles of alternating polarity along the surface facing the airgap, and the adjusting magnet is magnetized with poles of alternating polarity so that the poles align with poles of the braking magnet. Control of the flux in the airgap is facilitated by axially sliding or turning the adjusting magnet relative to the braking magnet to change the relative position of the poles.

3,588,769

ARMATURE FOR ELECTROMAGNETIC DEVICE

Richard H. Buckwalter, Latrobe, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 18, 1969, Ser. No. 877,646
Int. Cl. H01f 7/08
U.S. Cl. 335—230 **7 Claims**



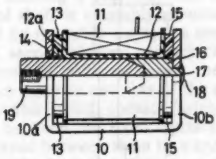
An armature for an electromagnetic device including electromagnetic-field producing means and armature operative by the means; the armature includes a mandrel having a web with thickened end portions and having an elongated thin metal strip wrapped around the web in successive convolutions with the edges of the strip being in contact with the corresponding end portions.

3,588,770

OPEN-BOX TYPE DC SOLENOID

Katutosi Higuma, Tokyo, Japan, assignor to Kabushiki-kaisha Chukyo Gijutsu Center, Tokyo, Japan

Filed Nov. 25, 1969, Ser. No. 879,704
Claims priority, application Japan, Apr. 19, 1969, 44/35888
Int. Cl. H01t 7/08
U.S. Cl. 335—255 **2 Claims**



An open-box type DC solenoid, in which a bobbin mounted with a coil and taken into a U-shaped frame from its open side is pressedly supported by a pair of ringed spacers each inserted in the space between the bobbin and either one of the upright sidewalls of the frame. A stopper which is inserted inside the tubular hole of the bobbin to position the inner end of a plunger near to the middle of the axial length of the coil is only caulked at its outer end to the frame to fix its position, while other components are fixedly supported by each other without caulking. One of the spacers is mounted on the stopper and the other is mounted on a flange extending outwardly coaxially from the bobbin or a plunger guide inserted into the bobbin, the latter spacer having relatively high magnetic permeability and concentrating or converging magnetic flux around the plunger.

3,588,771

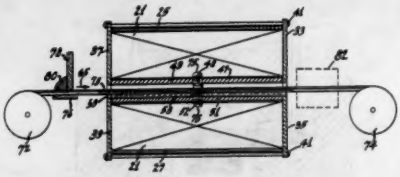
METHOD AND APPARATUS FOR MANUFACTURING MAGNETIC RECORDING TAPE

David F. Martin, Princeton, N.J., assignor to RCA Corporation

Division of Ser. No. 495,042, Oct. 12, 1965. Filed Dec. 14, 1967, Ser. No. 708,740
Int. Cl. H01f 13/00
U.S. Cl. 335—284 **4 Claims**

A method of manufacturing magnetic recording tape having at least two tracks which are transversely oriented with

respect to each other comprises coating a tape web and then passing the wet coating through a special magnet having a pair of opposed zigzag gaps which produces a magnetic field having longitudinally directed and transversely directed portions. The coating is then solidified and the web slit into tapes. The magnet for orienting the magnetic particles com-



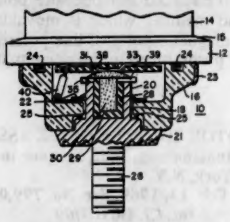
prises a core having a longitudinal axis and two spaced confronting portions on each side of the axis. Each of the portions have two pieces and are spaced to provide a gap of a predetermined distance. The gaps describe zigzag courses in the transverse direction to the axis and the gaps are opposed to one another. The apparatus includes means for inducing magnetic flux in each of the confronting portions.

3,588,772
FUSED CIRCUIT INTERRUPTER
James P Ellsworth, and Glenn R. Thomas, Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Continuation of application Ser. No. 518,133, Jan. 3, 1966, now abandoned. This application July 11, 1967, Ser. No. 652,624
Int. Cl. H01h *85/56*
U.S. Cl. 337—8 **9 Claims**

A fused circuit interrupter comprising a housing with a manually operable interrupter structure supported on the housing and a removable fuse unit removably supported on the housing in electrical series with the contacts of the switch structure. The circuit interrupter includes structure for preventing removal of the fuse when the interrupter structure is in the "on" or contact-closed position. The circuit interrupter also includes structure for preventing the operation of the interrupter contacts to the closed position when the interrupter contacts are open and the fuse unit is removed. Means are also provided to prevent the insertion of a fuse having a rating that is higher than is desirable.

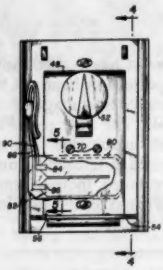
3,588,773
EXPLOSIVE CIRCUIT INTERRUPTING DEVICE
Charles H. Carothers, Bloomington, Ind., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Apr. 16, 1969, Ser. No. 816,538
Int. Cl. H01h *39/00*
U.S. Cl. 337—30 **2 Claims**

A circuit interrupting or disconnector device for lightning arresters comprising a breakable insulating housing adapted to be secured to one end of an arrester, or attached separately to an arrester, the housing supporting a ground terminal means therein. The ground terminal means is provided with a recess for receiving and holding an explosive charge in the



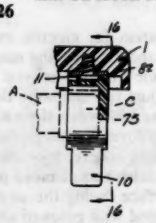
housing in spaced relation therewith to form a spark gap therebetween. A resistor is electrically connected across the spark gap, the spacing of the gap being set by an insulating sleeve disposed in the recess and about the charge.

3,588,774
THERMOSTAT
Frank Caveney, West Carteret, N.J., assignor to Federal Pacific Electric Company, Newark, N.J.
Filed Feb. 5, 1969, Ser. No. 796,827
Int. Cl. H01h *37/04, 37/14, 37/52*
U.S. Cl. 337—100 **6 Claims**



A thermostat is provided with a heating element adhered over an area of the room-temperature sensing bimetal, and the bimetal is arranged to operate a snap switch that controls the current supply to an electric heater for the room in which the thermostat monitors the ambient temperature. The adhered heating element operates not merely as a conventional anticipator but develops shorter on-and-off cycle times of current supply to the room electric heater, reducing temperature swings and reducing droop.

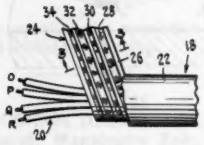
3,588,775
FUSE HOLDER FOR ELECTRICAL CIRCUITS
Edmund F. Poehlman, Jr., Silver Spring, Md., assignor to Fuse Indicator Corporation, Rockville, Md.
Division of Ser. No. 646,534, June 16, 1967, Pat. No. 3,434,789. Filed Nov. 1, 1968, Ser. No. 783,159
application Nov. 1, 1968, Ser. No. 783,159
Int. Cl. H01h *85/24*
U.S. Cl. 337—226 **3 Claims**



A fuse clip adapter of an L-shaped configuration for limiting the position of a ferrule contact of a standard enclosed cartridge type fuse retained in a U-shaped fuse clip. The

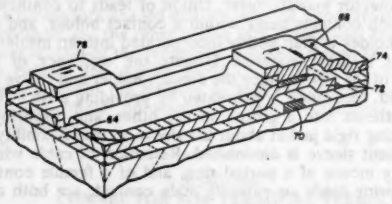
adapter includes means for retaining its base section within the bottom flat position of the fuse clip whereby the upstanding stop section extends within the open free ends of the fuse clip for contact with the ferrule of the fuse.

3,588,776
SAFETY CABLE
Elwood R. Horwinski, Chesire, Conn., assignor to Lewis Engineering Company, Naugatuck, Conn.
Filed Jan. 13, 1969, Ser. No. 790,784
Int. Cl. G08b *21/00;* **H01b** *7/32;* **H01h** *37/76*
U.S. Cl. 337—415 **5 Claims**



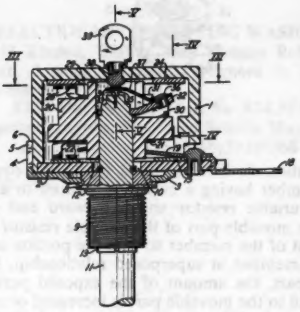
A cable having a safety feature whereby it is adapted to monitor and signal conditions of heat, cold, abrasion, fire, explosion, etc. comprising a bundle of core wires about which there is spirally wrapped a flexible paper-thin plastic ribbon in or on which conducting means comprising one or more longitudinally extending insulated conductors are carried. The conductor means may have a very low fusing point, or they may be adapted to constitute the bulb element of a resistance thermometer bridge or both. The low fusing point conductor means are connected with an indicator device at a signalling station adjacent one end of the cable. The indicator signals when the circuit is broken as by melting due to excessive heat. At this signalling station a resistance thermometer or equivalent device is connected to the conductor means constituting the bulb, whereby a continuous check is had on temperature conditions of the cable.

3,588,777
SUPERCONDUCTING TUNNELING BARRIERS
Walter H. Schroen, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed July 15, 1968, Ser. No. 744,826
Int. Cl. H01c *7/16;* **H01v** *11/02*
U.S. Cl. 338—32 **32 Claims**



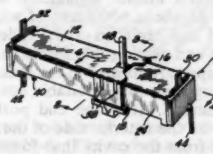
Apparatus and the method of interconnecting superconducting tunneling barriers formed on an insulating substrate by photographic techniques. Metal strips deposited on the insulating substrate serve as the two superconductors of a sandwich configuration separated by an insulating tunneling barrier. To form a typical barrier array, the first superconductors are deposited and covered with a photoresist. A window is opened in the photoresist at each of the first conductors for fabrication of the barriers. A barrier is then formed on each of the first superconductors in the window area by an oxidation process to form what is commonly known as a "Josephson barrier." The second superconductor for each barrier of the array is then deposited on top of the photoresist material. Appropriate tailoring of the photoresist material forms "waveguides" that interconnect the barriers into groups. Radiation from one barrier of a group travels through the waveguide photoresist to affect the voltage and current profile of an interconnected barrier.

3,588,778
COMBINATION ELECTRIC SWITCH AND VARIABLE RESISTOR
Joseph Arthur Edwards, Jr., Wake Forest; Vernon Bishop, Durham; Melan Geci, and Dudley H. Campbell, Raleigh, N.C., assignors to Stackpole Components Company, Raleigh, N.C.
Filed Feb. 3, 1970, Ser. No. 8,196
Int. Cl. H01c *9/08, 5/08*
U.S. Cl. 338—172 **6 Claims**



A rotor in a housing is provided with an axial passage, in which a control shaft is rotatably mounted. A first electric contact carried by the rotor engages a resistance element in the housing. A second electric contact carried by the rotor engages an electrical collector inside the housing and has ends facing each other at one side of the rotor to form fixed contacts. A movable switch contact fastened to the shaft extends laterally between the fixed contacts, where it is normally held centered between them by a spring connecting the shaft and rotor. The frictional resistance of the rotor to being turned is greater than the resistance that the spring offers to turning of the shaft in the rotor, so when the shaft is rotated it will swing the movable switch contact into engagement with one of the fixed contacts to turn the rotor. When the shaft is released, the spring will center the movable contact between the fixed contacts again.

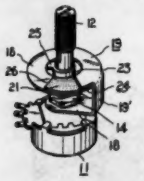
3,588,779
LINEAR MOTION VARIABLE RESISTANCE CONTROL
Charles Richard Goerg, Milwaukee, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.
Filed Nov. 13, 1969, Ser. No. 876,501
Int. Cl. H01c *9/02*
U.S. Cl. 338—183 **8 Claims**



The channel-shaped housing of a linear motion variable resistance control is provided with a closed or unslotted top

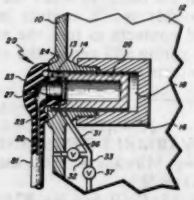
wall and a dielectric base, to which the resistant and conductive elements are mounted, is disposed in the housing so as to define parallel, elongated openings between the housing sidewalls and the longitudinal edges of the base. A carrier block carrying the bridging contact is provided with side members which extend through these openings and a slider, guided by the exterior of the housing, is operably attached to at least one of the carrier block side members.

3,588,780
INDICATION DEVICE FOR SOUND PRODUCING EQUIPMENT
Tetsuro Takimoto, Fujisawa, Japan, assignor to Victor Company of Japan, Limited, Yokohama City, Japan
Filed Mar. 25, 1970, Ser. No. 022,636
Claims priority, application Japan, Mar. 29, 1969, 44/28,073
Int. Cl. H01c *9/02, 5/02*
U.S. Cl. 338—196 **8 Claims**



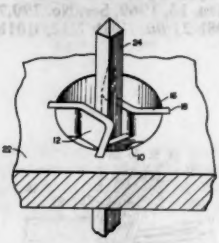
An indication device for sound producing equipment in which a member having a cutout is secured to a stationary part of a variable resistor and a forward end of a plate secured to a movable part of the variable resistor is inserted in the cutout of the member so that the portion of the plate lies on the member in superposed relationship. By moving the rotary part, the amount of the exposed portion of the plate secured to the movable part is increased or reduced, so that variations in the value of resistance is indicated by the amount of the exposed portion of the plate.

3,588,781
BULKHEAD CONNECTOR MEANS
James L. Williams, Cerritos, Calif., assignor to North American Rockwell Corporation
Filed Oct. 10, 1969, Ser. No. 865,328
Int. Cl. H01r *13/52*
U.S. Cl. 339—12 **8 Claims**



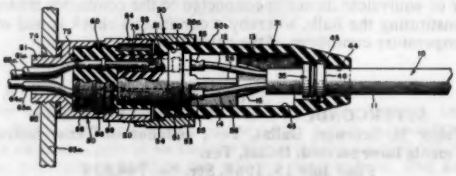
A bulkhead connector means, capable of withstanding a hydrostatic pressure of about 6000 feet of water and being readily disconnected and replaced while under about 6000 feet of water, has an end portion that forms an annular pressure seal around an aperture formed in the bulkhead of a vessel, the aperture being sealed by a suitable cover, removable from the interior thereof. After the end portion is placed against the aperture on the exterior side of the bulkhead, the sea water is drained from the cavity thus formed so that the hydrostatic pressure forms the pressure seal around the aperture by pressing the connector tightly thereagainst. From the interior of the vessel the cover is removed exposing the end portion and the connection is made thereto.

3,588,782
GROUND BUSHING
William H. McKee, West Covina, Calif., assignor to United-Carr Incorporated, Boston, Mass.
Filed Feb. 25, 1969, Ser. No. 802,012
Int. Cl. H01r *3/06*
U.S. Cl. 339—14 **2 Claims**



This is a ground bushing adapted to engage a soft metal grounding plate which will be flush with the upper surface of the grounding plate after engagement.

3,588,783
MULTIPLE CONDUCTOR CABLE CONNECTOR
Albert P. Newman, Springfield Township, Hamilton County, Ohio, assignor to KDI Sealtron Corporation
Filed Sept. 20, 1968, Ser. No. 761,254
Int. Cl. H01r *13/14*
U.S. Cl. 339—59 **5 Claims**

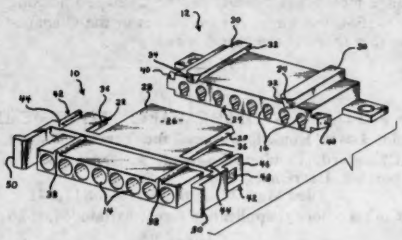


A terminal connector for a multiple conductor electrical cable is provided which may readily be applied to the cable by the user rather than being integrally molded to the cable by a connector manufacturer. Union of leads to contacts is made, such contacts being within a contact holder, and the contact holder is then bodily incorporated into an insulating sleeve of resilient material. Despite the resiliency of the material of the sleeve, once the contact holder and sleeve are integrated, separation is prevented by providing a rib in one which extends into a groove in the other, and disposing a close fitting rigid jacket about the sleeve so that flexibility of the resilient sleeve is diminished. Retention of cable within sleeve by means of a partial ring, and of a female contact which spring loads an entering male contact, are both also contemplated.

3,588,784
ELECTRICAL CONNECTOR HOUSING ASSEMBLY
John Philip Kunkle, Harrisburg, and Robert Charles Swengel, Jr., York, Pa., assignors to AMP Incorporated, Harrisburg, Pa.
Filed Jan. 27, 1969, Ser. No. 793,956
Int. Cl. H01r *13/62*
U.S. Cl. 339—65 **4 Claims**

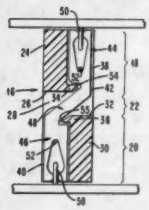
A connector housing assembly for contact terminals comprising a pair of mating housings formed of plastic insulating

material and having an aligning means to ensure that the housings are confined to a desired path during mating of the



housings thereby avoiding the possibility of damage to the contact terminals within the housings.

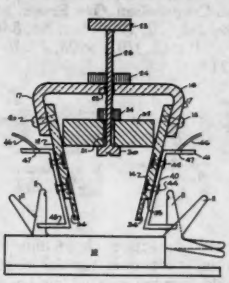
3,588,785
CONNECTOR ASSEMBLY
Alfred T. Hardardt, Wappingers Falls, and Edward C. Uberbacher, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Dec. 3, 1969, Ser. No. 881,792
Int. Cl. H01r *13/08, 13/42;* **H05k** *1/12*
U.S. Cl. 339—64 **10 Claims**



A housing is provided having a plurality of thin walls located adjacent and parallel to one another with equal small spacings therebetween. Each spacing between the walls defines a receptacle having an upper and lower section separated by a middle section. The middle section has an opening which extends through the housing and which is sufficiently large so that an end section of a double-ended contact member can pass therethrough. The double-ended contact member has a tuning fork-shaped end section at each end of a middle section. After one end of the double-ended contact member is passed through the middle section opening of the receptacle, the contact member is pivoted so that one tuning fork-shaped end fits into the upper section of the receptacle and the other tuning fork-shaped end fits into the lower section of the receptacle. Locking means are provided for holding the double-ended contact member loosely in position within the housing so that the contact member is pivotally within predetermined limits established by the locking means.

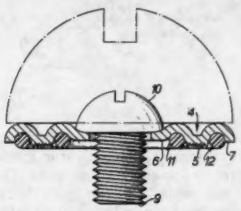
3,588,786
CONNECTOR FOR TERMINAL STRIPS
Joseph A. Alfiero, 802 15th St., W. Babylon, N.Y.
Filed Nov. 10, 1969, Ser. No. 875,461
Int. Cl. H01r *13/54*
U.S. Cl. 339—75 **9 Claims**

A connector for making contact to an electrical terminal strip having spaced apart pins arranged in rows. A preferred embodiment of the connector comprises two rectangular plates of insulator material with channel-shaped contactors of conductive material spaced apart along one edge of each plate to correspond to the spacing of the pins of the strip. A U-shaped bracket each of whose flanges has one of the plates mounted thereon maintains the plates with the contactors facing outwards. A wedge mounted between the confronting surfaces of the plates is used to selectively spread the plates



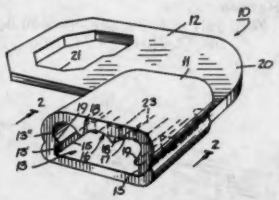
apart in order to push the contactors against the pins and ensure reliable contact.

3,588,787
ELECTRICAL CONNECTING WASHER
Colin David Kindell, Bushey, and Terence Robert Raynor, Chingford, London, England, assignors to AMP Incorporated, Harrisburg, Pa.
Filed May 15, 1969, Ser. No. 824,951
Claims priority, application Great Britain, May 17, 1968, Aug. 16, 1968, 23615/68;39198/68
Int. Cl. H01r *3/06*
U.S. Cl. 339—95 **2 Claims**



A connecting washer is provided with projections which scrape through a surface of a metal part to make an electrical connection. Parts of a second resilient insulating washer are trapped between the connecting washer and the metal part and around the projections to protect the connection area of the projections and the metal part from corrosive action.

3,588,788
TWO-PIECE INSULATION PIERCING CONNECTOR
Francis A. O'Loughlin, Scotch Plains, N.J., assignor to The Thomas & Betts Corporation, Elizabeth, N.J.
Filed Dec. 20, 1968, Ser. No. 785,596
Int. Cl. H01r *11/20, 11/08*
U.S. Cl. 339—98 **14 Claims**



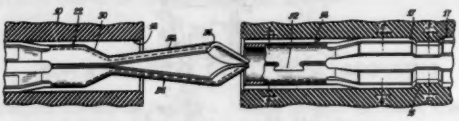
The connector is made of a rigid wrought metal insert and a sintered metal body. The body has a bore in which the bars of the insert are mounted and in which the film insulated conductors are received. Upon being compressed, the body forms a gastight electromechanical connection while the bars pierce the film insulation.

3,588,789

MINIATURE CONNECTOR CONSTRUCTION

William A. Kailus, North Riverside, Ill., assignor to The Bunker-Ramo Corporation, Oak Brook, Ill.

Filed July 10, 1969, Ser. No. 840,715
Int. Cl. H01r *9/08, 13/50*
U.S. Cl. 339—217 **11 Claims**



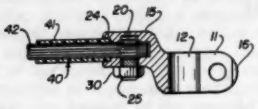
Pin and socket contacts each of one piece construction, having substantially identical tubular central portions with longitudinal slots forming ribs which are yieldable radially, the ribs having a circumferential detent recess therein; and connector blocks with holes for selectively receiving either the pin contact or the socket contact, and each hole having a circumferential detent bead received in the recess in the contact, releasably retaining the contact in the block.

3,588,790

BATTERY POST TERMINAL CLAMP

John K. Shannon, 6504 43rd Ave., Kenosha, Wis.

Filed Feb. 4, 1969, Ser. No. 796,458
Int. Cl. H01r *11/10, 11/26*
U.S. Cl. 339—230 **3 Claims**



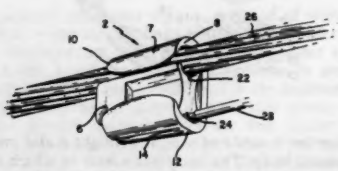
The disclosure is of a battery terminal post clamp having a pair of opposed clamping jaws with stud means at the end for securing the terminal to the battery post. The shank portion which receives the cable has a tie bolt, threaded at one end, with a cable receiving hole in the central portion aligned with a hole in the shank to receive the cable. The bottom portion of the tie bolt is threaded for engagement with a nut which, when the end of the cable is inserted in the tie bolt hole, can be turned to thereby jammingly engage the cable end forming a physical and electrical bond with the battery terminal. The method of manufacture contemplates a die casting in which the tie bolt itself serves as a core member, and an additional core is inserted through the hole in the tie bolt to the end that the tie bolt is perfectly aligned in the precast battery terminal, and in a sense is press-fittingly engaged therein, subject to dislodgment only by turning the fastening nut to engage the cable end.

3,588,791

ELECTRICAL CONNECTOR

Mario Polidori, Pennsauken, N.J., assignor to AMP Incorporated, Harrisburg, Pa.

Filed July 8, 1969, Ser. No. 840,000
Int. Cl. H01r *13/24, 7/06*
U.S. Cl. 339—247 **6 Claims**



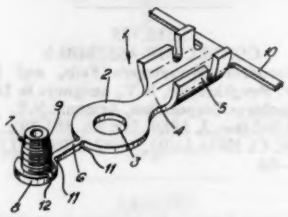
A wedge-type electrical connector adapted to connect a small tapoff wire to a large existing wire is disclosed. The connector is defined by a generally C-shaped housing member made of electrically-conductive metal such as aluminum, and wedge members made of similar metal. The wedge member is driven into the C-shaped housing member to confine the wires. A nest means in the C-shaped housing member receives the tapoff wire.

3,588,792

FASTENER WITH SHEARABLE FIXING MEMBER

Colin David Kindell, Bushey, and Terence Robert Raynor, Chingford, London, England, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 27, 1969, Ser. No. 811,041
Claims priority, application Great Britain, Mar. 29, 1968, 15322/68
Int. Cl. F16b *43/00;* **H01r** *11/26*
U.S. Cl. 339—263 **4 Claims**



A ring tongue terminal is integrally formed with a stamped screw joined to a ring by a carrier strip arranged so that on bending of the strip the screw can be positioned through the ring aperture and on tightening of the screw the carrier strip shears.

ERRATUM

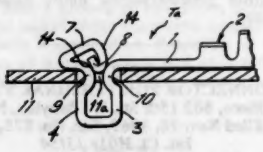
For Class 339—258 see:
Patent No. 3,588,862

3,588,793

PANEL MOUNT WEDGE CONNECTOR

Colin David Kindell, Bushey, and Terence Robert Raynor, Chingford, London, England, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 27, 1969, Ser. No. 811,040
Claims priority, application Great Britain, Mar. 29, 1968, 15321/68
Int. Cl. H01r *11/08*
U.S. Cl. 339—276 **6 Claims**



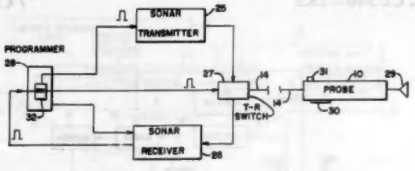
A panel connector, for example for a grounding connection, has a crimping ferrule and a hairpin bend arranged for insertion through a panel aperture. One limb of the hairpin is bent back for entry between the limbs and on driving the bent-back portion between the limbs the hairpin is secured in the panel aperture by wedge action.

3,588,794

UNDERWATER DATA ACQUISITION DEVICE

Samuel A. Francis, Marion, Mass., assignor to The Buzzards Corporation, Marion, Mass.

Continuation of application Ser. No. 542,781, Apr. 15, 1966, now abandoned. This application Apr. 4, 1969, Ser. No. 817,245
Int. Cl. G01s 9/66
U.S. Cl. 340—3 22 Claims



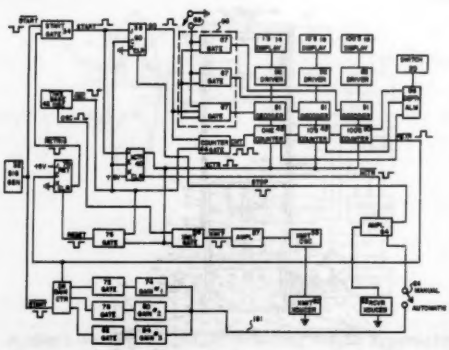
The invention relates to an underwater data acquisition system wherein a sensing probe is deployed from an aircraft into a water medium. A sonar transmitter and receiver are located in the aircraft and are electrically connected to the probe. When the probe has reached a depth within the water medium at which the cavitation bubble collapses, that is when acoustical transmission from the probe is optimal, the sonar transmitter is caused to operate to transmit sonar energy to the probe.

3,588,795

DEPTH INDICATOR

Stathis G. Linardos, Clearwater; Richard F. Elmhurst, and William A. Elmhurst, Largo, Fla., assignors to Lykes Bros. Incorporated, Systems & Engineering Division, Clearwater, Fla.

Filed Feb. 27, 1969, Ser. No. 802,998
Int. Cl. G01s 9/68
U.S. Cl. 340—3 11 Claims



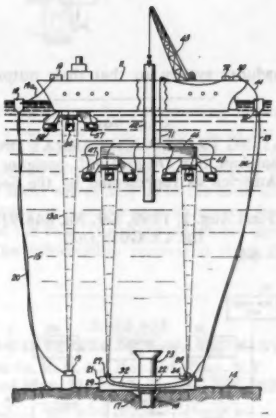
A solid-state indicator for indicating a depth of water featuring a digital readout display which is accurate, easily read, and draws a minimum amount of current. The indicator includes an automatic gain that is automatically stepped upwardly together with a newly transmitted sound wave when a previous sound wave has still not been received. Also provided is an automatic alarm that is simply actuated by connecting the alarm to the digital outputs of the counters. The alarm is set at a particular depth and is sounded whenever the counters are stopped by a reflected sound wave at a depth of water below this setting.

3,588,796

METHOD AND APPARATUS FOR POSITIONING A MANEUVERABLE NAVAL STRUCTURE OVER A FIXED POSITION

Fontaine C. Armistead, Darien, and Peter L. Paull, Weston, Conn., assignors to Texaco Inc., New York, N.Y.

Continuation of application Ser. No. 600,368, Aug. 14, 1967, now abandoned. This application Apr. 16, 1969, Ser. No. 820,036
Int. Cl. G01s 3/00
U.S. Cl. 340—6 14 Claims



A method and apparatus for controlling the position of a maneuverable naval structure which is floating upon or immersed in the sea so that it is over a fixed position by the combination of an ultrasonic beam directed to a receiving apparatus which generates an electrical signal indicative of both the distance and the direction which the beam receiving means is off the center of the received beam, with propulsive means supported by said structure responsive to said signal to align the beam receiving means with the received beam.

3,588,797

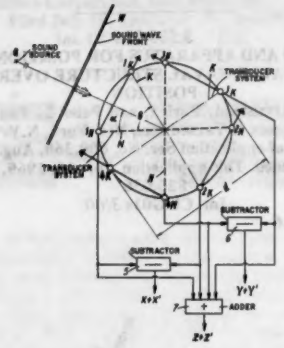
APPARATUS FOR COMPENSATING HARMONIC-DEPENDENT COMPONENTS IN A DIRECTION-SENSITIVE ACOUSTIC TRANSDUCER SYSTEM

Gunter Hans Ziehm, Kiel, and Karl-Friedrich Triebold, Bremen-Osterholz, Germany, assignors to Krupp Gesellschaft mit beschrankter Haftung Fried, Essen, Germany

Filed July 11, 1969, Ser. No. 841,096
Claims priority, application Germany, July 12, 1968, P 17 66 754.8
Int. Cl. G01s 3/00
U.S. Cl. 340—6 4 Claims

Apparatus for compensating the harmonic-dependent components of the difference voltages produced by a direction-sensitive sound pressure gradient transducer system. The transducer elements of the transducer system are distributed around the circumference of a circle and the difference voltages derived from the pairs of elements lying on opposite sides of the circle. According to the invention, an additional transducer system, identical to the first, is provided with its transducer elements arranged in the same circle but displaced by an angle $\pi k+1$, where k equals 1, 2, ... The trans-

ducer elements of the additional transducer system are connected together with the corresponding elements of the



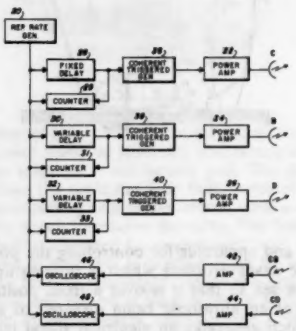
original transducer system so that their output signals are added.

3,588,798

LOCATING TRANSDUCER ARRAY ON KEEL

Milton D. Papineau, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Aug. 1, 1969, Ser. No. 846,910
Int. Cl. G01s *3/00*
U.S. Cl. 340—6-R 5 Claims



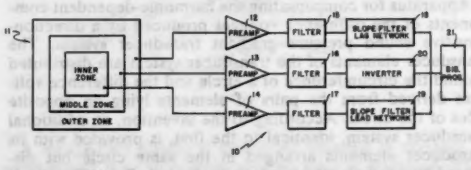
To locate a ship-mounted transducer array with respect to the fire control centerline of the ship, the ship is anchored, and three acoustic projectors are spaced about the ship at fixed known positions. One element of the array is used as a receiver for two of the projectors. The signal of the nearest is delayed to null with the signal of the other projector, and the process is repeated for the other pair of projectors. The two intersecting hyperbolas pinpoint the array.

3,588,799

ZONED ARRAY SONAR SYSTEM

Kenneth W. Gross, Forrest Hills, N.Y., assignor to the United States of America as represented by the Secretary of the Navy

Filed Sept. 15, 1969, Ser. No. 858,019
Int. Cl. G01s *3/00*
U.S. Cl. 340—6 5 Claims



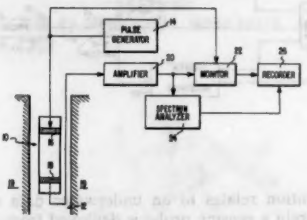
A slope filtering arrangement for a zoned array sonar system using RC networks and appropriate inverters. The different zones are provided with different frequency responses without significant phase discrepancies between the various signal processing channels provided for the zones.

3,588,800

METHOD OF DETERMINING CHARACTERISTICS OF EARTH FORMATIONS

Edward J. Moore, and Kantilal P. Desai, Tulsa, Okla., assignors to Atlantic Richfield Company, New York, N.Y.

Filed Apr. 3, 1968, Ser. No. 718,540
Int. Cl. G01v *1/00*
U.S. Cl. 340—15.5 7 Claims



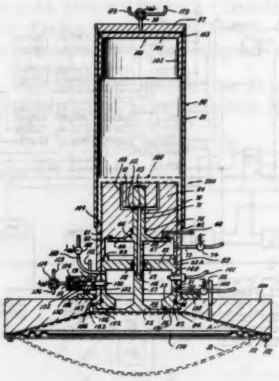
A method of and apparatus for determining characteristics of earth formations. A pulse of acoustic energy is passed from an electroacoustic transmitter, through the earth formation, to an electroacoustic receiver. The received signal is applied to a spectrum analyzer which produces a spectrum indicative of the amplitudes of the different frequency components within the received signal. This frequency spectrum can be recorded for further analysis.

3,588,801

IMPULSE GENERATOR

Willie B. Leonard, 1922 West Gray, Houston, Tex.

Filed Nov. 7, 1968, Ser. No. 773,996
Int. Cl. H04r *23/00*
U.S. Cl. 340—12 20 Claims

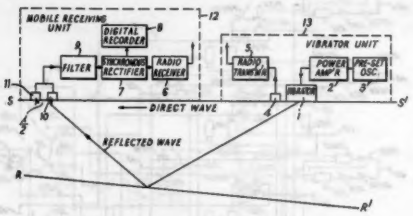


Hydrocarbon fuel is exploded in a container causing the closure to pop open, generating an impulse in the surrounding medium, for example, water. Combustion air in container is heated by compression prior to explosion of fuel. Closure is biased to closed position by air pressure differential which is overcome by pressure of explosion. Initial movement of closure removes bias air pressure differential. A variety of means are shown for receiving the explosion gases to prevent oscillation thereof.

3,588,802
WAVE ENERGY SOURCE LOCATION BY AMPLITUDE AND PHASE MEASUREMENT

William Edward Lerwill, Keston, Kent, England, assignor to Seismograph Service Corporation, Tulsa, Okla.

Filed Jan. 7, 1969, Ser. No. 789,584
Claims priority, application Great Britain, Jan. 9, 1968, 1276/68
Int. Cl. G01s *3/80*; G01v *1/30*
U.S. Cl. 340—15.5SC 14 Claims

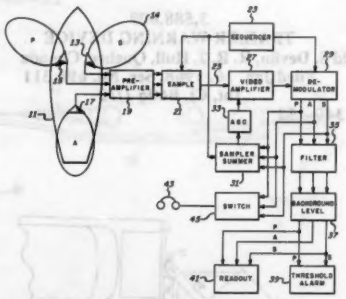


Real or virtual sources of single frequency radiation are located by charting the amplitude and relative phase of the radiations passing through a plane surface, and by then analyzing the resultant chart. In seismic exploration, virtual sound sources are created below interfaces by a single frequency mechanical vibrator, and the reflected sound waves are charted. Noise problems are overcome with high Q filtering and correlation processing techniques. The use of single frequency excitation source makes it possible to chart the sound radiations at a leisurely rate with a single sound detection unit, and allows determination of the slant of subterranean interfaces as well as the depth of the interfaces.

3,588,803
SHIP'S WARNING SYSTEM

Robert F. Fleming, Jr., and Robert F. Riggs, Charlottesville, Va., assignors to Sperry Rand Corporation, Great Neck, N.Y.

Filed Mar. 12, 1969, Ser. No. 806,633
Int. Cl. G01s *3/00*
U.S. Cl. 340—16 7 Claims

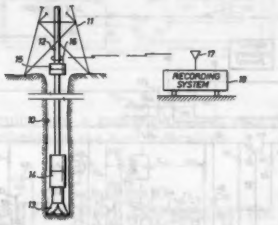


A ship's warning system for detecting vessels approaching in the forward sector by analyzing sounds received by a plurality of forward-looking microphones. Sounds arriving from astern are detected by an auxiliary microphone. The signals from the various microphones are sequentially sampled and amplified in an automatic gain controlled amplifier in which the gain is limited by the amplitude of the largest received signal. Relatively intense sounds from the forward sector are amplified and actuate an alarm. Relatively intense sounds from astern affect the auxiliary microphone most strongly and reduce the gain of the amplifier so that the corresponding signals from the forward-looking microphones cannot actuate the alarm.

3,588,804
TELEMETERING SYSTEM FOR USE IN BOREHOLES

Jacob Robert Fort, El Paso, Tex., assignor to Globe Universal Sciences, Inc., Midland, Tex.

Filed June 16, 1969, Ser. No. 833,580
Int. Cl. G01v *1/40*
U.S. Cl. 340—18 10 Claims

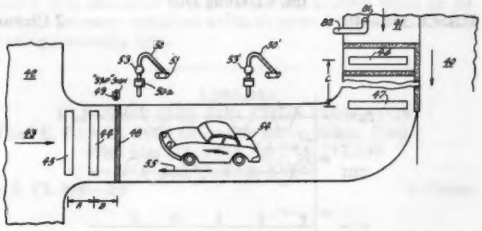


A telemetering system for transmitting information from the bottom of a borehole to the surface using the drill pipe as a transmission link wherein the information is transmitted on a carrier consisting of ultrasonic shear waves induced in a drill pipe. The shear waves may be in the form of a pulsed ultrasonic frequency or a continuous ultrasonic frequency or a combination of the two. The shear waves are detected at the surface and the information recovered from the detected signal.

3,588,805
HIGHWAY INTERSECTION WARNING SYSTEM

John Jospeh Davin, R. D. #2, Box 214, Troy, N.Y.

Filed Mar. 11, 1969, Ser. No. 806,103
Int. Cl. G08g *1/02*
U.S. Cl. 340—31R 6 Claims



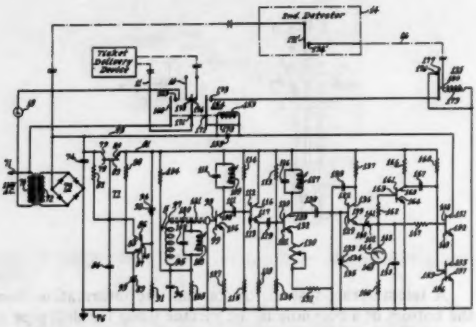
An intersection warning system wherein a pair of spaced-apart treadle-type switches are disposed in one of the roads. The first switch is electrically arranged to activate a light warning system on both roads. This is inactivated when the intersection is clear and the vehicle passes over the second treadle. When adapted to an exit ramp the two switches activate time delay relays so that when the vehicle passes over the second switch within a selectable time the warning system does not operate. However, when the vehicle is delayed or slowed the warning system operates. One set of treadles is disposed at the ramp terminal and the other proximate the ramp entrance. Where an automobile attempts to enter the exit ramp in the wrong direction the second switch is tripped and the alarm activated. The warning system consists of lamps carried on poles along the ramp. The entrance treadles activate warning lights along the highway to inform oncoming motorists of the ramp condition.

3,588,806

SELECTIVE VEHICLE DETECTOR

Merton Wilcox, Sarasota, Fla., assignor to Sarasota Engineering Co., Inc., Sarasota, Fla.

Filed Dec. 28, 1966, Ser. No. 605,493
Int. Cl. G08b 13/00; G08g 1/00
U.S. Cl. 340—38 2 Claims



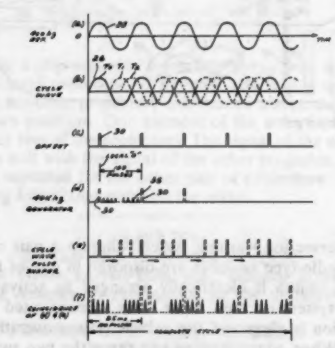
A small continuously operating tuned signal generator device including a tank coil and comprising a clamp for attachment of the device to a vehicle with the tank coil generally horizontal and a cooperative receiver including a loop adapted to be buried connected to a receiver tuned to the frequency of the signal generator whereby the appearance of the vehicle over the loop actuates the receiver.

3,588,807

TRAFFIC CONTROL SYSTEM AND APPARATUS

Charles L. DuVivier, Darien, Conn., assignor to LFE Corporation, Waltham, Mass.

Filed Jan. 27, 1969, Ser. No. 794,056
Int. Cl. G08g 1/07
U.S. Cl. 340—40 7 Claims



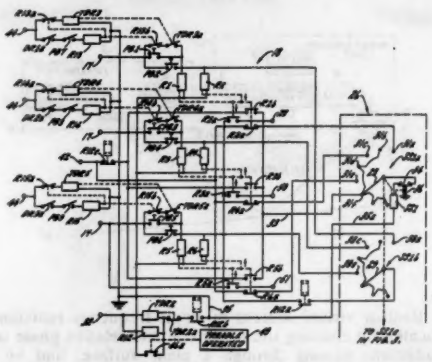
An improved apparatus is provided for use in a traffic control system of the type wherein the traffic cycle length is determined by the time between adjacent phase coincidences of two wave energies, one of which is gradually shifting in phase with respect to the other. The improved apparatus is adapted to subdivide each traffic cycle, in time, and may be used to trigger command signals to occur at predetermined percentage points of the cycle.

3,588,808

IMPROVED TRAFFIC CONTROL SYSTEM FOR DRIVE-IN BANKS AND THE LIKE

Rolfe T. Gustus, Mout Prospect, Ill., assignor to Electronic Traffic Control, Inc.

Filed June 21, 1968, Ser. No. 739,009
Int. Cl. G08g 1/00
U.S. Cl. 340—41 9 Claims



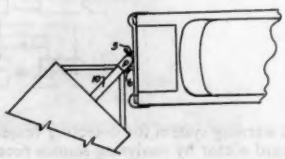
A system for controlling movement of traffic from a dispatching station, such as the entrance to a drive-in bank, to a plurality of serving stations, such as the teller windows in a drive-in bank. The system includes a sign or other means for instructing traffic at the dispatching station, a central control unit for energizing the instructing means, an actuating means at each of the serving stations to send actuating signals to the central control unit. The actuating means included a manual actuator which can be operated by the teller in a drive-in bank, for example, and also automatic actuators which respond to the arrival and departure of vehicles at the serving station to send actuating signals to the control unit. The control unit responds to the actuating signals to present sequential messages on the instructing means to direct the traffic at the dispatching.

3,588,809

TRAILER WARNING DEVICE

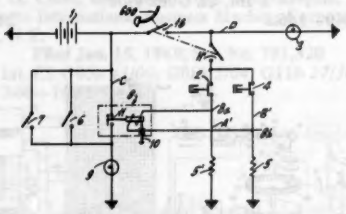
Archibald S. Devlin, R. R. 2, Hull, Quebec, Canada

Filed Jan. 16, 1968, Ser. No. 698,311
Int. Cl. B60q 1/12
U.S. Cl. 340—52 3 Claims



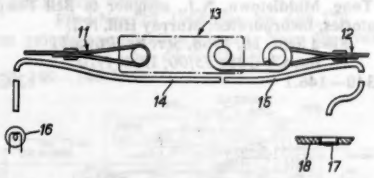
A warning device is provided for use with a conventional trailer hitch. It includes a plate securable to the trailer hitch and a pair of arms adjustable within arcuate slots in the plate. The ends of the arms are provided with signal actuating devices. The signal is actuated by contact with the trailer hitch drawbar to warn the vehicle operator that the trailer and vehicle are dangerously close to each other.

3,588,810
ELECTRICAL WARNING SYSTEM FOR VEHICULAR BRAKE INSTALLATIONS
Hans Christof Klein, Frankfurt am Main; Hans Beller, Bad Vilbel, and Gert Schrader, Walldorf, Hessen, Germany, assignors to Alfred Teves Maschinenund Armaturenfabrik KG, Frankfurt am Main, Germany
Filed July 12, 1967, Ser. No. 652,760
Claims priority, application Germany, Dec. 7, 1966, Sept. 1, 1966, Aug. 6, 1966, Aug. 6, 1966, July 27, 1966, T32694;T31696;T31789;T31790;T31689
Int. Cl. B60t *17/22*
U.S. Cl. 340—52 14 Claims



Brake system having a pair of fluid-operated brake networks including substantially concurrently actuatable master-cylinder chambers and respective sets of wheel brakes communicating therewith, an ignition battery, a brake or tail lamp energizable by the battery upon operation of the brake pedal, and a pair of fluid-responsive switches each operatively connected with a respective one of said networks for operating an electrical warning lamp on the dashboard effective upon failure of hydraulic pressure in one of the networks for indicating such failure.

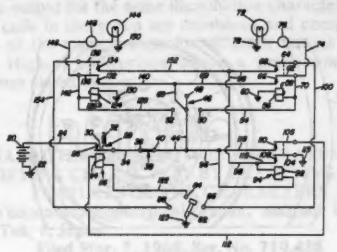
3,588,811
WARNING DEVICE FOR USE WITH SEATBELTS
Alfred Donald Prickett, Handsworth Wood, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England
Filed Apr. 11, 1968, Ser. No. 720,520
Claims priority, application Great Britain, May 3, 1967, 20560/67
Int. Cl. B60g *1/00*
U.S. Cl. 340—52 1 Claim



When a seatbelt on a road vehicle is fastened, the ends of two optical cables associated with the two parts of the seatbelt are aligned, and light passes through one of the cables into the other cable and thence to a warning device to indicate that the belt is properly fastened.

3,588,812
VEHICLE TURN SIGNAL
Richard A. Wheelock, 4535 Orchard Av., San Diego, Calif., and Elmer C. Evans, P.O. Box 523, Elizabeth, N.C.
Filed Nov. 10, 1966, Ser. No. 593,476
Int. Cl. B60q *1/34*
U.S. Cl. 340—55 8 Claims

A vehicle turn signal system which uses four relays to sequentially energize the actuating, holding, illuminating, and

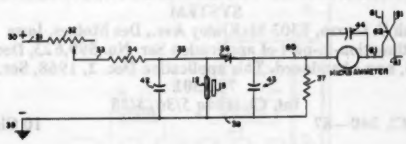


cancelling circuits, and a steering column cancelling switch to effect cancellation of the turn indication.

3,588,813
TIRE PRESSURE SIGNAL SYSTEM
Kennard E. Robinson, Box 235, Syracuse, Ind., and Clifford J. Schott, 2004 Hogarth, Toledo, Ohio
Filed Aug. 17, 1967, Ser. No. 661,335
Int. Cl. B60c *23/04*
U.S. Cl. 340—58 4 Claims

A tire pressure sensing device comprising a housing with a floating spring-biased piston movable between axial positions corresponding to normal and abnormal tire pressures is mounted within the profile of the wheel rim supporting the tire. A flexible diaphragm having one side exposed to tire pressure and its opposite side engaging the piston urges the piston into abutment with an electrical contact when an abnormal pressure condition exists to close an electrical circuit having a warning light.

3,588,814
ELECTRIC TIRE INFLATION INDICATOR
Thad E. Furlong, 2660 Greenway Drive, Salem, Oreg.
Filed Mar. 11, 1968, Ser. No. 712,140
Int. Cl. B60c *23/06*
U.S. Cl. 340—58 4 Claims

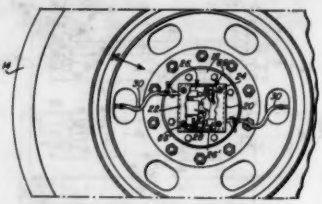


Means for and method of converting the rotational travel speed of the wheels of a vehicle into signals whose value will be proportional to the variable speed of rotation of the wheels in accordance with the inflated condition of their respective pneumatic tires.

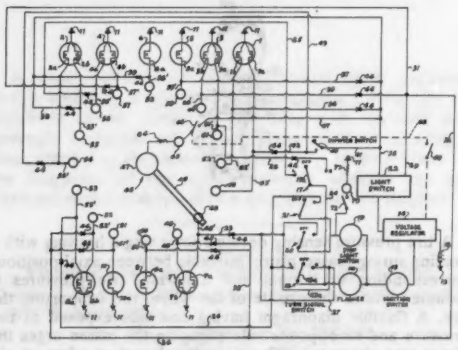
3,588,815
TIRE PRESSURE WARNING DEVICE
Clyde Koonce, 803 W. 67th St., Odessa, Tex.
Filed Dec. 3, 1968, Ser. No. 780,715
Int. Cl. B60c *23/00*
U.S. Cl. 340—58 7 Claims

Tire pressure sensors energize a wheel mounted transmitter resulting in generation of an R-F signal when tire pres-

sure decreases below a minimum value. A remote control receiver positioned nearby a vehicle operator senses a transmitted signal and an alarm or indicating device connected thereto alerts the vehicle operator.

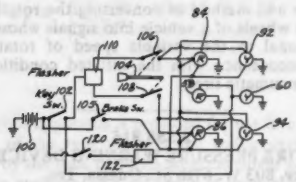


3,588,816
MONITOR SYSTEM FOR VEHICLE LIGHTS
Raymond H. Himes, 15 Merrimac St., Buffalo, N.Y.
Filed July 3, 1968, Ser. No. 742,271
Int. Cl. B60q 1/04, 1/38; G08b 21/00
U.S. Cl. 340—80 **4 Claims**



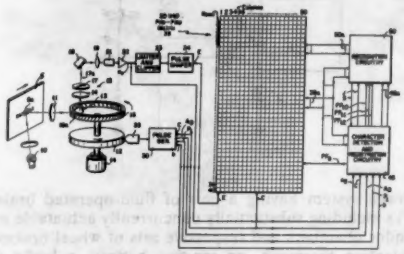
A system for checking the operation of exterior running and/or signal lights of motor vehicles, aircraft, trailers, boats, and the like; which is characterized by a performance indicator employed in combination with a switching arrangement adapted to successively place the indicator in circuit with the filaments of the various lights to be checked.

3,588,817
PLURAL SIGNAL VEHICLE LIGHT SIGNALLING SYSTEM
Joseph F. Gazzo, 1303 McKinley Ave., Des Moines, Iowa
Continuation-in-part of application Ser. No. 599,623, Dec. 6, 1966, now abandoned. This application Dec. 2, 1968, Ser. No. 781,301
Int. Cl. H04q 5/36, 5/38
U.S. Cl. 340—87 **10 Claims**



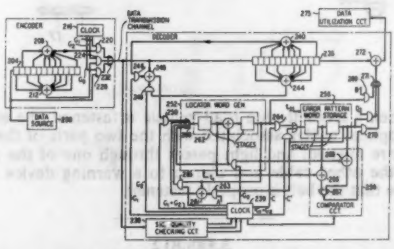
A signalling unit for mounting on top of a vehicle including a trio of lights visible from any point near the vehicle. The outer wing lights are operatively connected to the brake and turn signal circuitry while the center lights are connected to the ignition system. The outer wing lights are carried on wings extending upwardly, outwardly and rearwardly of the center light unit thereby giving emphasis to each of the lighting units at any point around the vehicle.

3,588,818
CHARACTER RECOGNITION SYSTEM EMPLOYING CONTINUITY DETECTION AND REGISTRATION MEANS
David B. Congleton, Redondo Beach; Sydney Glazer, Los Angeles, and Melvin S. Armstrong, Lomita, Calif., assignors to The National Cash Register Company, Dayton, Ohio
Filed July 7, 1967, Ser. No. 651,855
Int. Cl. G06k 9/00
U.S. Cl. 340—146.3 **24 Claims**



A character recognition system which detects and registers a character based on a measure of the continuity or connectivity of character portions during the scanning of a character. Each character is optically scanned, converted into electrical form, and then serially entered into an electronic flip-flop matrix. A particular group of matrix flip-flops are chosen to serve as a "window" and these flip-flops operate in conjunction with respective logical circuits for determining character continuity for each portion of a character as it progresses through the matrix. Varying printing contrasts are automatically handled by providing for appropriate modification of the logical circuits which determine continuity in response to the existing printing contrast.

3,588,819
DOUBLE-CHARACTER ERASURE CORRECTING SYSTEM
Shih Y. Tong, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Sept. 18, 1968, Ser. No. 760,611
Int. Cl. G08c 25/00; H04l 1/10
U.S. Cl. 340—146.1 **12 Claims**



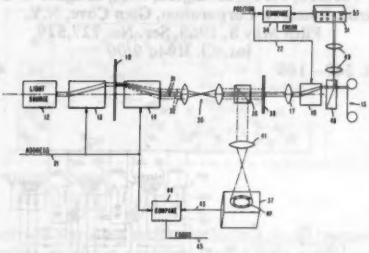
Information characters of l-bit length are encoded in a convolution code of rate up to $(2^K-1)/2^K$, (where 2 -1 is an even multiple of 2^K-1) and then transmitted over a communication channel to a receiving terminal. The received characters are processed to (1) obtain two partial syndromes

S_0 and S_1 associated with the two most recently received blocks of characters, each block containing 2 characters, and (2) determine character erasures, i.e., the position of errors. Determination of character erasures is done by performing signal quality checks on the characters such as null-zone detection. The two syndromes S_0 and S_1 are then utilized to correct the character erasures. Single-character erasures in any 2 -character block can be corrected without the requirement of a guard space. In addition, double-character erasures in any 2 -character block can be corrected provided the subsequent block is error free.

3,588,820
CHARACTER CHECKING APPARATUS FOR OPTICAL CHARACTER GENERATOR

Richard O. Cobb, and James Lipp, Poughkeepsie, N.Y., assignors to International Business Machine Corporation, Armonk, N.Y.

Filed Jan. 15, 1969, Ser. No. 791,320
Int. Cl. G03b *43/00*; G06k *5/04*; G11b *27/36*
U.S. Cl. 340—146.1 6 Claims

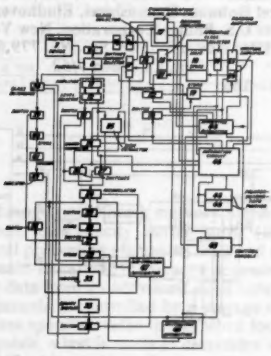


An optical character generator is improved by providing checking bits for the characters of the character mask. The checking bits are sensed on the output side of the character generator and are compared with a character address supplied to the character generator. A mismatch between the address of the selected character and the checking bits sensed at the character generator output signifies a failure in the character generator or the associated apparatus.

3,588,821
IMAGE CLASSIFYING BY ELEMENTAL GROUPING, READING AND COMPARING

Michel Marie Joseph Lasalle, L'Haye-les-Roses, and Gerard Charles Maurice Jourdan, Paris, France, assignors to Societe Anonyme: Societe Alsacienne De Constructions Atomiques De Telecommunication Et D'Electronique (ALCATEL), Paris, France

Filed Nov. 28, 1967, Ser. No. 686,274
Claims priority, application France, Nov. 30, 1966, 85,705
Int. Cl. G06k *9/12*
U.S. Cl. 340—146.3AG 1 Claim

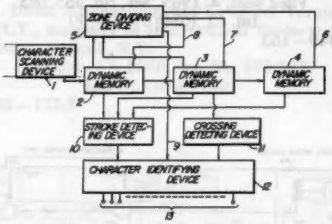


Images are classified by dividing an image into elements. Each element is associated with a photocell, and photocells are grouped in even numbers comparison half of the photocells producing a positive output, and half producing a negative output for the same illumination characteristic. Outputs of cells in the group are combined and compared with outputs of the same groups for different images in known classes. Highest comparison above a predetermined level determines classification.

3,588,822
CHARACTER RECOGNITION APPARATUS FOR IDENTIFYING CHARACTERS BY DETECTING STROKE FEATURES OF THE CHARACTERS

Shinji Yamamoto, Hachioji-shi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 5, 1968, Ser. No. 710,488
Claims priority, application Japan, Mar. 6, 1967, 42/13714
Int. Cl. G06k *9/10*
U.S. Cl. 340—146.3 7 Claims

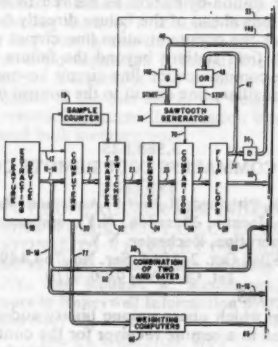


The character face is divided into three zones and scanned in vertical and horizontal directions by means of a scanner to be converted into time series digital signals in response to the presence of a character image, which digital signals are fed to cascade connected three dynamic memories. From the digital signals stored in the dynamic memories stroke features are detected by a feature detecting device. The character is recognized by identifying the combination of the stroke features by means of a character identifying device. The character recognition apparatus of the invention is simple in structure and free from noise disturbance.

3,588,823
MUTUAL INFORMATION DERIVED TREE STRUCTURE IN AN ADAPTIVE PATTERN RECOGNITION SYSTEM

Chao K. Chow, Chappaqua, and Chao N. Liu, Yorktown Heights, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 28, 1968, Ser. No. 716,732
Int. Cl. G06k *9/00*
U.S. Cl. 340—146.3 14 Claims



An adaptive pattern recognition system is provided which calculates the mutual information provided by pairs of fea-

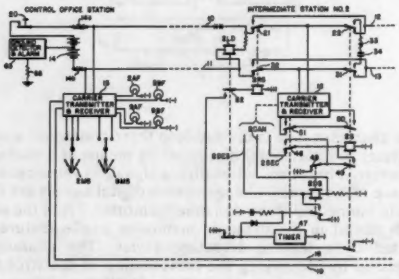
tures extracted by a feature extracting device. The relative magnitudes of mutual information are detected seriatim and a closed loop avoidance module prevents forming a closed loop, to retain a statistical tree relationship. Pattern logic stores the set of pairs having highest values of mutual information. Then the system is prepared to operate as a recognition system. The individual features are weighted, according to statistical analysis, by analogue computers. Also, the pairs of information are gated and weighted for each pattern in accordance with statistical weighting principles. The summing networks for a plurality of patterns are compared in a maximum detector for ultimate recognition of the most likely pattern identification.

3,588,824

SPARE CHANNEL SYSTEM FOR SECTIONALIZING A COMMUNICATION LINE CIRCUIT

William M. Barker, Scottsville, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Sept. 4, 1969, Ser. No. 855,163
Int. Cl. H04q 5/00, 9/00
U.S. Cl. 340—163 **7 Claims**



A communication line circuit connects a control office station with a plurality of successive remotely spaced field stations. An auxiliary line circuit extends from the control office to the most remote field station. The communication line circuit is normally energized, and a line detector relay at each station senses such energization. In case of line circuit failure, the dropping away of the detector relays at various stations activates sectionalizing means and indicators at the control office manifest the general area of the failure. Controls for desectionalization can be transmitted from the control office to the several field stations to put the line circuit back together station-by-station as desired to communicate with field stations ahead of the failure directly from the control office over the communication line circuit and to communicate with field stations beyond the failure through the section of the communication line circuit beyond the failure and over the auxiliary line circuit to the control office.

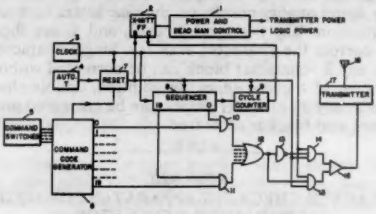
3,588,825

DIGITAL COMMALESS CODE REMOTE CONTROL SYSTEM

Carl G. Shook, Pittsford; Robert F. Anderson, Rochester, and Samuel J. Macano, Macedon, N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Filed Oct. 2, 1968, Ser. No. 764,449
Int. Cl. H04q 9/00, 9/10
U.S. Cl. 340—163 **17 Claims**

A system in which phase unique binary coded commands are transmitted to a remote receiver for the control of equipment. The bits of each command are repetitively sequentially transmitted and when received serially entered into a shift register. Upon entry of each bit, the information then stored in the register is cycled through the register prior to entry of the next succeeding bit and gates recognize whenever the proper coded command appears in the stages of the shift register. Storage units responsive to the recognized command then



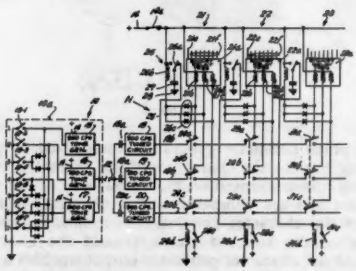
exert control on the equipment in accordance with the desired function.

3,588,826

CHOSEN SELECTION TRANSMITTAL SYSTEM

Angelo Vaccaro, Port Washington, N.Y., assignor to Columbia Controls Research Corporation, Glen Cove, N.Y.

Filed May 8, 1968, Ser. No. 727,529
Int. Cl. H04q 9/00
U.S. Cl. 340—166 **4 Claims**



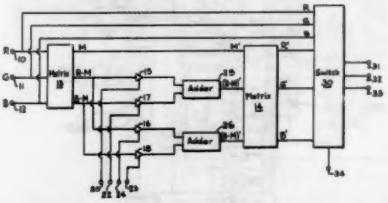
A system for selecting at a remote station any one of a plurality of outputs at a central station in which the selection is accomplished by initially translating the selection into a binary code of tones, passing the tones over a wire interconnecting the remote and central stations and then translating the code of tones into the output selected by use of a binary coded relay means.

3,588,827

VARIABLE LINEAR MATRIX

Frederik Johannes Van Roessel, Mahwah, N.J., and Jan August Marcel Hofman, Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 29, 1968, Ser. No. 779,694
Int. Cl. H04n 9/52
U.S. Cl. 340—166 **10 Claims**



A variable linear matrix circuit for a plurality of signals, such as the three color signals in a color television camera, is comprised of a first fixed matrix, a variable matrix, and a

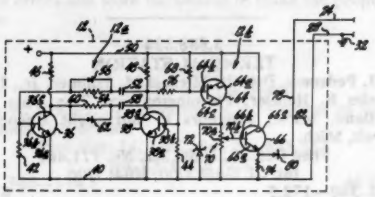
second fixed matrix, connected in that order. The coefficients of the matrices are selected to minimize the number of variables in the variable matrix. For example, in a color television camera system having three color signals, the number of variables to be controlled in the matrix may be reduced to four.

3,588,828

SIGNALING SYSTEM RESPONSIVE TO PULSES WITHIN AN AMPLITUDE RANGE

Joseph Schulein, Vancouver, Wash., assignor to H. Dutton Hayward Trustee of the Hilda Trusts 1—9 Inclusive, Tacoma, Wash. and Joseph and Margaret A. Schulein, Vancouver, Wash., fractional part interest to each

Filed Aug. 2, 1967, Ser. No. 657,925
Int. Cl. H04q 5/14
U.S. Cl. 340—169 **13 Claims**



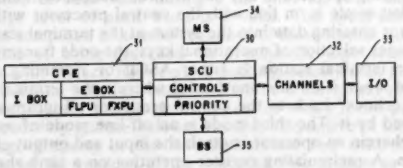
An electrical signaling system including plural transmitters, plural remote receivers each associated with a different one of the transmitters, and a pair of conductors interconnecting all of the transmitters and receivers for transmitting signals therebetween. The transmitters are operable to produce recurrent pulses with the pulses of different transmitters having different pulse heights. Each receiver includes pulse height sensitive circuitry which is responsive only to the pulses produced by the receiver's associated transmitter.

3,588,829

INTEGRATED MEMORY SYSTEM WITH BLOCK TRANSFER TO A BUFFER STORE

Lawrence J. Boland, and Gerry D. Granito, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 14, 1968, Ser. No. 776,858
Int. Cl. G06f 9/08
U.S. Cl. 340—172.5 **5 Claims**



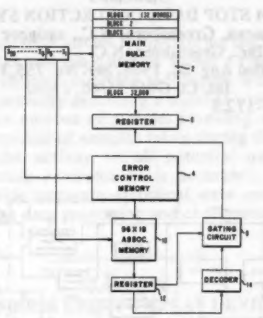
A data processing system has a memory hierarchy including a high-speed low-capacity buffer store (BS) located between a central processing element (CPE) and a low speed high-capacity main store (MS). Memory accessing, to store data in or fetch data from an addressed word location, by the CPE and by channels is controlled by a storage control unit (SCU). Addresses specified refer to MS word locations. For CPE access requests, a test is made to determine whether the content of the MS addressed location is resident in the BS. If it is, then a store is made in both the BS and MS while a fetch is made only from the BS. If the addressed word location is not resident in the BS, then a store is made only in MS and a fetch is made from the addressed location of MS. The data fetched from the addressed MS location is transferred to the CPE and loaded in a word location of the BS. When such a fetch is made to MS, the SCU also fetches additional words, contiguous to the addressed word, to form a block and loads the block in the BS. Overlapping operation allows a plurality of block transfers from MS to be initiated by the SCU for successive access requests which find the addressed locations nonresident in the BS. Channel requests access only the MS. Associated with each block of words in BS is a valid bit which permits access to words in BS only when set. During a channel store, if the addressed location is in the BS, the valid bit associated with that location is reset signifying that the data content of the corresponding MS location has been changed.

3,588,830

SYSTEM FOR USING A MEMORY HAVING IRREMEDIABLE BAD BITS

William J. Duda, Binghamton, and Lewis M. Terman, South Salem, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 17, 1968, Ser. No. 698,567
Int. Cl. G06f 11/00
U.S. Cl. 340—172.5 **5 Claims**



A system is set forth for utilizing batch fabricated memories despite the presence of permanently unusable bits in such memories. In addition to a main bulk memory, there is provided an error correction memory which stores the location and correct information to be substituted for each bad bit in the main bulk memory and which may be manufactured by the same technology employed to make the main bulk memory. When the bulk memory is accessed, the error correction memory is accessed simultaneously. The output of the error correcting memory is scanned for an indication of one or more bad bits in the simultaneously accessed bulk memory word. If no indication is found, the bulk memory word is correct as it stands; if one or more indications are found, the location of the bad bits in the bulk memory word and their corresponding correct information bits are inserted into the accessed bulk memory word.

3,588,831

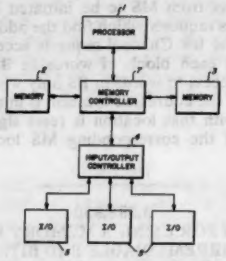
INPUT/OUTPUT CONTROLLER FOR INDEPENDENTLY SUPERVISING A PLURALITY OF OPERATIONS IN RESPONSE TO A SINGLE COMMAND

John W. Figueroa, Palo Alto, Calif.; William J. Morgan, Phoenix, Ariz., and Rolland R. Rasmussen, Ridgecrest, Calif., assignors to Honeywell Information Systems Inc.

Filed Nov. 13, 1968, Ser. No. 775,448
Int. Cl. G06f 3/00, 9/00
U.S. Cl. 340—172.5 **21 Claims**

In order to increase the throughput of an input/output controller within a modular data processing system, apparatus is provided within the input/output controller responsive to a single command to supervise the transfer of information

between a peripheral subsystem and a memory, during which transfer a plurality of records are affected in response to the



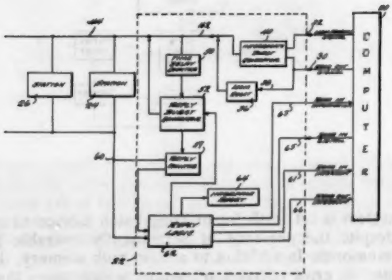
single command rather than a corresponding plurality of commands.

3,588,832

LOOM STOP DATA COLLECTION SYSTEM

Oliver C. Duncan, Greensboro, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.

Filed Aug. 26, 1968, Ser. No. 755,317
Int. Cl. G06f *15/46, 15/30*
U.S. Cl. 340—172.5 **15 Claims**



Apparatus and method for conveying information relating to the condition of a given textile machine, chosen from a plurality of machines, to a computer or recorder. In the embodiment disclosed, a given number of cycles of 500-kilohertz signals, the number of such cycles identifying the chosen loom, are sent to all the machines on an address line. Subsequently, 300-kilohertz cycles are sent down the same line after the 500-kilohertz cycles are ended. The chosen loom then allows a given number of 300-kilohertz cycles to pass to a return line which also connects all of the machines to the computer or recorder to inform the computer as to a given condition, each different number of cycles identifying a different condition.

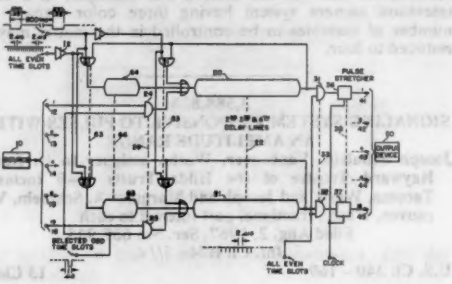
3,588,833

INTERLACED DYNAMIC DATA BUFFER

William F. Bartlett; Uno Randmere, Rochester, and Richard Scott, Pittsford, N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Oct. 18, 1968, Ser. No. 768,780
Int. Cl. G06f *13/02*
U.S. Cl. 340—172.5 **1 Claim**

A time interlaced dynamic data buffer arrangement in which alternate successive time slots in a dynamic storage device such as a recirculating delay line are assigned respectively to input and output signals. The output signals are



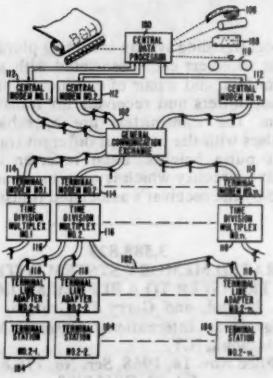
periodically erased, and, simultaneously, the input signals are transferred from the input to the output time slots.

3,588,834

TERMINAL STATION

John H. Pedersen, Detroit; Michael M. Malmer, Jr., Livonia; Charles B. Hebeler, Farmington, and Hoy Ying Chang, Westland, Mich., assignors to Burroughs Corporation,, Detroit, Mich.

Filed Oct. 29, 1968, Ser. No. 771,461
Int. Cl. G06f *3/00;* **H04l** *7/00*
U.S. Cl. 340—172.5 **6 Claims**



A remote terminal station connected by communication channels to a central processor for the communication of alpha and numeric information. The terminal station is capable of being operated in any one of three independent modes. The first mode is on line with the central processor with an operator entering data into the system at the terminal station. By proper selection of operational keys, the code transmitted by the terminal station is either ASCII or Hamming. The second mode is on line unattended wherein the terminal station "echoes" back to the central processor all information received by it. The third mode is an off-line mode of operation wherein an operator controls the input and output of the station. A recirculating register operating on a time sharing basis is used for synchronizing the operating speed of the terminal station with the speed of transmission over the communication lines.

3,588,835

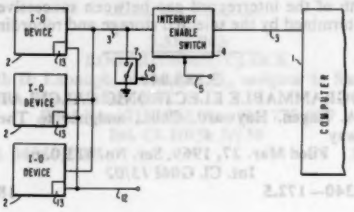
DEBUGGING OF ON-LINE DIGITAL COMPUTERS HAVING AN ACTIVE INTERRUPT

Robert S. Enabnit, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 14, 1969, Ser. No. 807,239
Int. Cl. G06f *9/18*
U.S. Cl. 340—172.5 **12 Claims**

This invention involves methods and circuitry for debugging programmable digital computers having an active

interrupt. An interrupt is automatically provided following each program instruction. Every interrupt interrogates input-output devices to determine which, if any, require service.



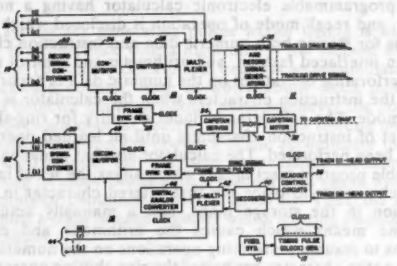
Errors may be located by a debug routine which follows the interrogation. This invention allows the programmer to readily locate errors and work backwards to make the proper corrections.

3,588,836

MAGNETIC RECORDING

William R. Frazier, Jr., Penfield, N.Y., assignor to General Dynamics Corporation

Filed Nov. 24, 1967, Ser. No. 685,353
Int. Cl. G11b *5/02*
U.S. Cl. 340—174.1 **46 Claims**



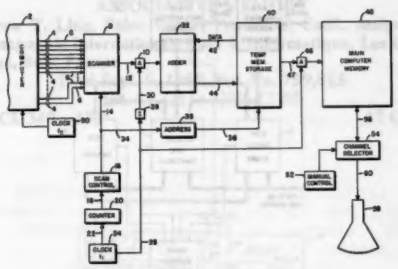
A multichannel recording system is described for recording both digital and analog information. The recording system includes apparatus for converting analog information into digital information having a predetermined format. Each track of the recording apparatus receives a series of encoded format words containing a plurality of ternary NRZ pulses, each represented by any one of three voltage levels; positive, negative or zero volts during a bit interval, such that the average level of each word is 0 volts. The spectrum of a signal composed of a serial sequence of these format words is capable of being recorded on a magnetic tape recording track with a much higher pulse packing density than heretofore possible with conventional NRZ or other binary recording techniques. The playback apparatus which forms part of the recording system includes circuitry responsive to the zero average property of the recorded words, and controls the timing of the readout of the recorded information so as to provide precise time coherence between all of the recorded channels. The latter circuitry also controls the system for deskewing the signals recorded simultaneously on parallel tracks on the tape during playback, thereby further enhancing the capability of this system to record information with extremely high pulse packing density. Both recording and playback is controlled by a common accurate clock so as to further insure coherence between signals recorded on all channels. Also included in the recording system is an input/output section which translates input analog information into digital form for recording in the various channels at rates and with the format compatible for recording with the system. The input/output section also rearranges the digital information read from the magnetic record into its original analog or digital form, as the case may be.

3,588,837

SYSTEMS ACTIVITY MONITOR

Ross D. Rash, Bloomington; Duane H. Anderson, St. Paul; Hilding E. Nelson, Scandia, and Paul D. Byrns, Stillwater, all of Minn., assignors to Said Kash, said Anderson and said Nelson assignors to Comcet Incorporated, St. Paul, Minn., fractional part interest to each

Filed Dec. 30, 1968, Ser. No. 787,955
Int. Cl. G06f *11/00*
U.S. Cl. 340—172.5 **8 Claims**



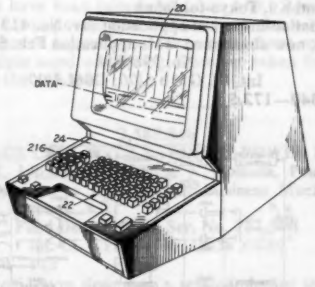
An instrumentation circuit for measuring the activity of all major data paths and other signals within a system against a time interval utilizing sampling techniques with the instrumentation dynamically recording a number which represents the ratio of the number of samples revealing a signal compared to the number of samples taken during the time interval whereby the activity on all potential queuing points within a dynamic environment is accurately recorded in order to provide accurate statistical data concerning the utilization of the data processing and communications equipment.

3,588,838

BUSINESS EVENT DISPLAY DEVICE

Marvin Felcheck, Monsey, N.Y., assignor to AMF Incorporated

Filed Apr. 5, 1968, Ser. No. 719,119
Claims priority, application Great Britain, May 9, 1967, 21510/67
Int. Cl. H01j *31/16*
U.S. Cl. 340—172.5 **33 Claims**

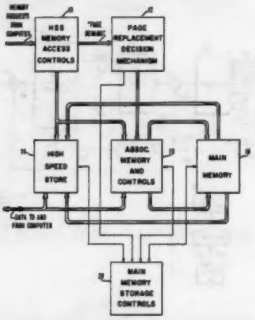


A business machine which presents on the face of a cathode-ray tube a visual display of item and quantity of item selected wherein the face of the cathode-ray tube is divided into discrete area, the areas being worked to identify specific items and item and amount selecting controls which, when activated effect the generation of a digit on the face of the cathode-ray tube within a specific discrete area to identify the item selected and the quantity of the item selected.

3,588,839
HIERARCHICAL MEMORY UPDATING SYSTEM

Laszlo A. Belady; Carl J. Kuehner, Yorktown Heights; Meir M. Lehman, New York, and Brian Randell, Pleasantville, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 15, 1969, Ser. No. 791,272
Int. Cl. G11c 9/00, 7/00
U.S. Cl. 340—172.5 15 Claims

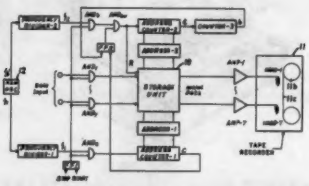


A computer memory system in which the data is transferred between high-speed local storage and one or more levels of a larger low speed storage wherein altered data is rewritten in high-speed storage immediately and in the low-speed storage on a cycle stealing basis. Controls are provided so that when a small segment of data in a particular block or page in high-speed store is altered an indicator is set. When memory buss time is available to the low speed or backup store these indicators will be checked and words or lines rewritten in said backup store as long as a higher priority job is not encountered. When it is desired to replace a complete page in high-speed storage, indicators for that page are checked and all altered words are rewritten immediately in the backup store on a high priority basis after which the page in the high-speed store may be overwritten with new data from the backup store.

3,588,840
METHOD OF BLOCK RECORDING DATA ON A MAGNETIC TAPE

Takuya Nomura, 15, 4-ban, 6-chome, Izumi-cho, Hoya-shi, Tokyo, Japan, and Yasuo Tada, 710,2-chome, Kugayama, Suginami-Ku, Tokyo-to, Japan

Continuation-in-part of application Ser. No. 413,583, Nov. 24, 1964, now abandoned. This application Feb. 5, 1969, Ser. No. 796,704
Int. Cl. G11b 5/00; G06f 3/00
U.S. Cl. 340—172.5 4 Claims

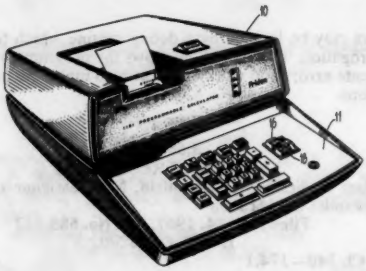


A method of block recording data on a magnetic tape comprises (1) feeding data at a selected first rate to a storage unit until there has been stored a selected amount less than data contained in one block and (2) feeding the stored data to a recording unit having a tape transport at a second selected rate which is faster than the first rate while continuing to feed data to the storage unit. The rates of storage and recording are selected so that the data stored in the storage unit are exhausted simultaneously with completion of recording of one block of data by the recording unit. The tape transport operates at a constant speed during both periods, the length of the interrecord gap between successive blocks being determined by the selected storage and recording rates.

3,588,841
PROGRAMMABLE ELECTRONIC CALCULATOR

Robert A. Ragen, Hayward, Calif., assignor to The Singer Company

Filed Mar. 27, 1969, Ser. No. 811,036
Int. Cl. G06f 15/02
U.S. Cl. 340—172.5 18 Claims

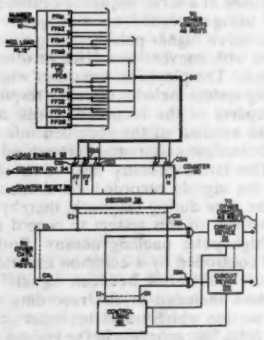


A programmable electronic calculator having a normal, learn, and recall mode of operation is disclosed which has a means for storing both numeric data and instruction characters in interlaced fashion, and arithmetic and control means for performing operations on the numeric data in accordance with the instruction characters when the calculator is in recall mode. The calculator includes circuitry for ring-shifting the set of instruction characters until all learned operations have been performed. The calculator also has a manually actuatable program reset means which aligns the set of instruction characters to place the first-entered character in recall position in the storage mans, and a manually actuatable resume means which causes the arithmetic and control means to resume performing operations on the numeric data after a stop character has halted the ring-shifting operation.

3,588,842
RANDOM SETTING OF A SCANNER

Robert K. Heldman, Naperville, Ill., assignor to GTE Automatic Electric Laboratories Incorporated

Filed July 23, 1968, Ser. No. 746,857
Int. Cl. G06f 7/10
U.S. Cl. 340—172.5 3 Claims



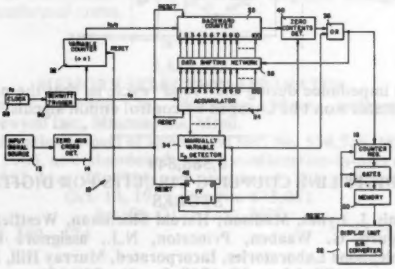
In a common-controlled communication switching system, the path scanner counter of the marker is set to a random

starting point by loading it with a number derived from a terminal-number-register, using individual output bits of the register in no particular order with respect to the terminal number stored therein. Thus uniform usage of the available paths is obtained.

3,588,843
LOGARITHMIC CLOCK

Kenneth D. Labaugh, Nashua, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Nov. 21, 1968, Ser. No. 777,809
Int. Cl. H03k *5/156*
U.S. Cl. 340—172.5 **26 Claims**

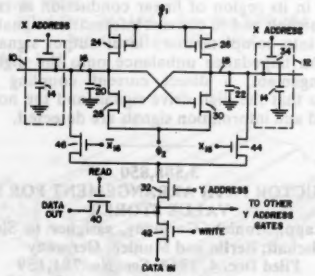


A system for generating pulses whose timing is substantially in accordance with a logarithm of the elapsed number of linear (periodic) clock pulses employs an accumulator and a backward counter, both of which count clock pulses. A count detector emits an output pulse whenever the count in the backward counter reaches zero. A data shifting network thereupon transfers the contents of the accumulator into the backward counter and the latter immediately recommences counting its clock pulses until it reaches zero again, while the accumulator continues counting upwardly. Thus, the detector emits a train of output pulses whose spacing increases exponentially.

3,588,844
SENSE AMPLIFIER FOR SINGLE DEVICE PER BIT MOSFET MEMORIES

Alton O. Christensen, Houston, Tex., assignor to Shell Oil Company, New York, N.Y.

Continuation-in-part of application Ser. No. 827,193, May 23, 1969. This application July 7, 1969, Ser. No. 839,720
Int. Cl. G11c *11/40;* H03k *3/286*
U.S. Cl. 340—173 **24 Claims**

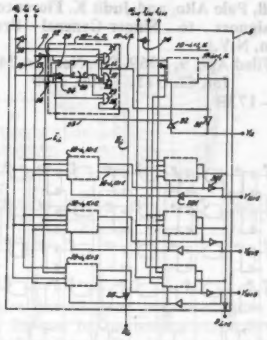


A highly efficient sense amplifier for metal oxide silicon chip memory arrays can be built by using a pair of cross-coupled sensing MOSFETs connected in a racing mode between a bit line capacitance and a precharge storage capacitance to produce a full-"1" or full-"0" bit line condition responsive to the capacitive information charge stored in an addressed bit, and transferred to the bit line which condition can serve both as a restoring signal and as a readout signal. Bit line capacitance can be reduced, and a separate precharge storage capacitance eliminated, by connecting each of the cross-coupled MOSFETs to half of the bit line, and using the line capacitance of the idle half of the bit line as the precharge storage capacitance.

3,588,845
ASSOCIATIVE MEMORY

Andrew T. Ling, Palos Verdes Peninsula, Calif., assignor to Compagnie Internationale Pour L'Informatique, Les Clayes sous, Bois, France

Filed Sept. 9, 1968, Ser. No. 759,815
Int. Cl. G11c *7/00, 15/00*
U.S. Cl. 340—173 **17 Claims**



An associative memory is disclosed composed of modules each having a plurality of storage cells selectively operable as data bit cells or associative search bit cells. The associative memory is organized in rows and columns. The cells on each column are connected to a data record control line being raised, if the bit in the accompanying bit value line is to be recorded in a cell on the column. A third line of the column is a search select line to identify a bit in the bit value line as search criterion. Cells in a row are connected to a line which provides an enabling signal if all cells on columns, whose search line have been raised, hold bits which agree with the bits in the corresponding bit value line; or have been externally addressed. A priority system among these row lines inhibits multiple word addressing. Data are taken from output lines along the columns.

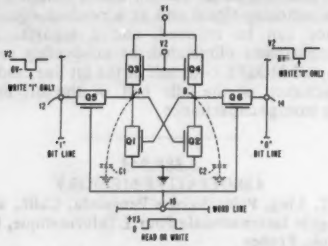
3,588,846
STORAGE CELL WITH VARIABLE POWER LEVEL

Richard H. Linton, and George Y. Sonoda, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 5, 1968, Ser. No. 781,528
Int. Cl. G11c *11/40;* H03k *3/286*
U.S. Cl. 340—173 **4 Claims**

This specification describes a semiconductor storage cell for use in monolithic memories. The storage cell has two crosscoupled FET's which function as the storage elements of the cell. The crosscoupled FET's are address powered through input/output FET's when the cell is interrogated for reading. When the cell is not being so interrogated, the crosscoupled FET's are supplied power from a source which is connected to each of the crosscoupled FET's by a separate load FET. The gates of those load FET's are biased so the load FET's supply charge to the crosscoupled FET's while the storage cell is not being interrogated but draw charge

from the crosscoupled FET's when the crosscoupled FET's are addressed for reading. By biasing the load FET's in this



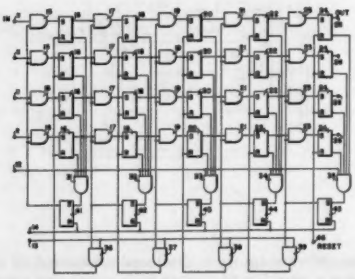
manner, the potential on the drain can be reduced so as to reduce the overall power dissipation of the storage cell.

3,588,847

AUTOMATIC FIRST-IN FIRST-OUT SYSTEM

Harold R. Dell, Palo Alto, and Judit K. Florence, Menlo Park, Calif., assignors to Singer-General Precision, Inc., Binghamton, N.Y.

Filed Apr. 9, 1969, Ser. No. 814,744
Int. Cl. G11c *19/00, 7/00*
U.S. Cl. 340—173R **8 Claims**



In information systems which serve a plurality of requestors upon request, means must be provided for storing the identification of the requesting apparatus in a priority system. One such priority system can be considered a chronological system received which the first request in is the first request filled. The system of this invention provides such a facility. Each request or requestor is identified by a digital code. When the requestor makes a request, its code is stored in the first register of a bank or registers. The next job to be performed is identified from the information stored in the last register in the bank of registers. This apparatus provides a system of gates for sensing when a register contains zeros or contains the identification of a requestor. At each cycle the requestor identification is shifted to the last register in the bank which contains only zeros, and is thereafter stepped into the next register as that becomes empty. Thus, all information which identifies requesting organizations is moved into the last register of the bank of registers. As each request is filled, the last register is cleared to zeros, permitting information stored in the next-to-the-last register to be shifted into the last register.

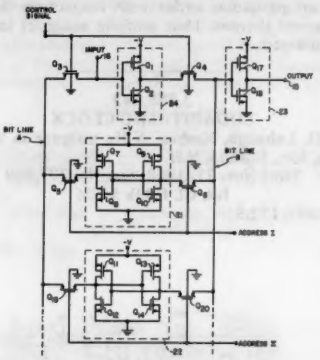
3,588,848

INPUT-OUTPUT CONTROL CIRCUIT FOR MEMORY CIRCUIT

Herman W. Van Beek, Houston, Tex., assignor to the United States of America as represented by the Secretary of the Army

Filed Aug. 4, 1969, Ser. No. 847,223
Int. Cl. G11c *11/40, 7/00*
U.S. Cl. 340—173 **4 Claims**

A control circuit for MOS memory circuits which provides a low impedance to bit lines during the "write" cycle and a



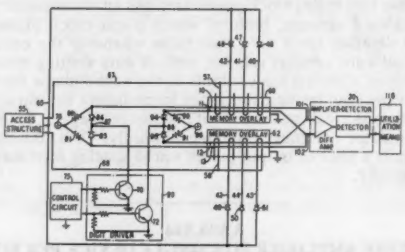
high impedance during the "read" cycle so that the memory cell states won't be changed by control circuit signals.

3,588,849

DIGIT LINE COUPLING CIRCUITS FOR DIGITAL STORES

Dennis J. Lynes, Madison; Harold Shichman, Westfield, and Sigurd G. Waaben, Princeton, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 19, 1968, Ser. No. 738,156
Int. Cl. G11c *7/00, 11/14*
U.S. Cl. 340—174 **23 Claims**



A group of direct current coupling arrangements for a magnetic memory provide design alternatives which reduce magnetic memory cycle time and fabrication cost. In each arrangement, balanced digit lines, which are arranged in two symmetrical modules, are direct current coupled to both a digit drive circuit and an amplifier-detector circuit. Word selection circuits are arranged symmetrically to couple similar spurious noise signals into the digit lines of both symmetrical modules. The amplifier-detector circuit is arranged to operate in its region of linear conduction in response to digit drive signals and to convert information signals from the digit lines into complementary level output signals without reflecting an impedance unbalance onto the digit lines. In each arrangement, a direct current coupling circuit is designed so that the digit drive signals and the noise signals are rejected and information signals are detected.

3,588,850

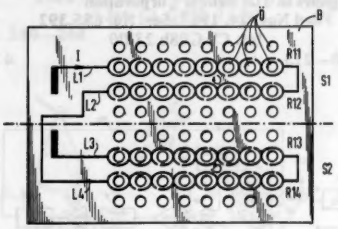
CONDUCTOR PATH ARRANGEMENT FOR FIXED VALUE STORER

Gunther Rapp, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Dec. 4, 1968, Ser. No. 781,159
Claims priority, application Germany, Dec. 12, 1967, P 15 49 066.1
Int. Cl. G11c *17/00, 11/04, 7/02*
U.S. Cl. 340—174 **1 Claim**

A fixed value storer for transformer cores, in which the transformer cores extend through openings in a sheet-form

carrier which is provided with conductor paths for control, the configuration of the conductor paths determining the

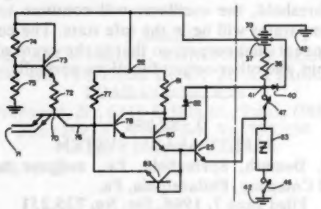


stored-in information by the particular magnetic linkages to the transformer cores.

3,588,851
MEMORY SELECTION APPARATUS

William F. Jordan, Jr., Wellesley, Mass., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation-in-part of application Ser. No. 536,736, Mar. 23, 1966, now abandoned, and a continuation-in-part of 536,912, Mar. 23, 1966, now abandoned. This application Oct. 13, 1967, Ser. No. 675,081
Int. Cl. G11c *5/02, 7/02*
U.S. Cl. 340—174 **21 Claims**

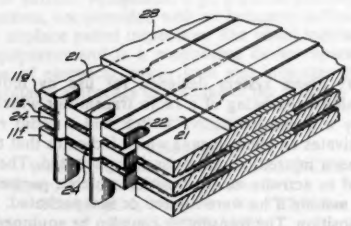


Electronic selection circuits for operating coincident-current magnetic memories, and like apparatus, are provided for construction essentially entirely as integrated circuits, even the output drive stages. The circuits are arranged to transform ground-referenced input signals to output signals for driving floating reactances without the transformers required in the prior art for voltage isolation. Further, the new circuits drive these reactive loads without excessive power dissipation or excessive transient voltages.

3,588,852
MEMORY ASSEMBLY

Thomas L. McCormack, Chelmsford, Mass.; Maurice A. Morin, Nashua, N.H., and Donald T. Staffiere, Wilmington, Mass., assignors to Cambridge Memory Systems, Inc., Farmington, Mass.

Filed Dec. 26, 1967, Ser. No. 699,284
Int. Cl. G11c *5/08, 5/04*
U.S. Cl. 340—174 **5 Claims**

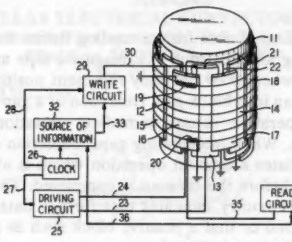


An assembly of vertically stacked magnetic memory planes and a process for manufacturing this assembly. Each plane has a matrix of memory elements laid out on *x* and *y* coordinates with the drive conductors brought out to the edge of the planes as printed strips. Each row on each plane is serially interconnected with the corresponding rows on the remainder of the planes by connecting wires soldered into slots cut into the printed connectors at each edge. The entire assembly is maintained in registration by vertical registration posts. The assembly can be manufactured using a process in which all of the connections on a side of the assembly are wave soldered simultaneously in one operation. A storage capacity of 6×10^6 has been achieved in a 10''×10''×5½' block.

3,588,853
MAGNETIC WIRE

Henry C. Theuerer, New York, N.Y., and Paul A. Turner, Basking Ridge, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 25, 1968, Ser. No. 715,597
Int. Cl. G11c *11/14, 19/00*
U.S. Cl. 340—174 **7 Claims**

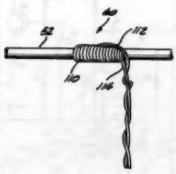


The disclosure describes an improved form of reentrant magnetic wire for use in magnetic storage devices such as domain wall shift registers. The improvement is obtained by reducing the nonuniformities in the magnetic characteristics of the wire (found to be caused by the surface defects) by coating the wire with a thin film of the same or a similar magnetic material.

3,588,854
LOW NOISE READ WINDING

Tommy G. Lesher, Fullerton, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 23, 1968, Ser. No. 786,158
Int. Cl. G11c *19/00, 11/14, 7/02*
U.S. Cl. 340—174MC **1 Claim**

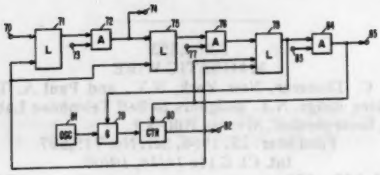


A magnetic shift register including a fine drawn wire magnetic recording medium of cobalt, iron and vanadium which is annealed, the wire being wound under tension in a helix around a cylindrically disposed polyphase advancing array which includes a plurality of advancing windings oriented transverse to the wire so that a magnetic domain recorded on a segment of the wire can be propagated through the length of the wire by the polyphase advancing array when current pulses are applied to the windings. A read winding is disposed around the wire toward one end thereof so that the propagated magnetic domain induces an output signal in it as it is propagated therethrough.

3,588,855
DATA GAP RESPONDING APPARATUS

Richard F. Scully, Longmont, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 14, 1968, Ser. No. 767,196
Int. Cl. G11b 27/22, 5/02
U.S. Cl. 340—174.1 9 Claims

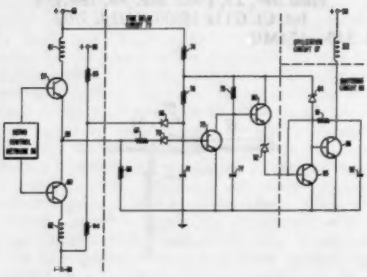


Gaps in a stream of data from a reading station associated with a recording medium such as a magnetic tape are tested to determined whether or not they represent positive information such as an interblock gap. Detection of a gap during a write check operation causes immediate cessation of the write operation. When interpreting gaps, detection of a gap in the data initiates a timeout operation which is aborted if data reappears before the timeout is completed. The output of the timeout circuitry indicates that further data reading should be effected or that a positive block such as an interblock gap has been encountered.

3,588,856
FAILURE WARNING SYSTEM

Douglas M. Bauer, Danvers, and Martin J. Nagel, Lynn, Mass., assignors to General Electric Company

Filed July 17, 1968, Ser. No. 745,504
Int. Cl. G08b 19/00, 5/24
U.S. Cl. 340—181 5 Claims

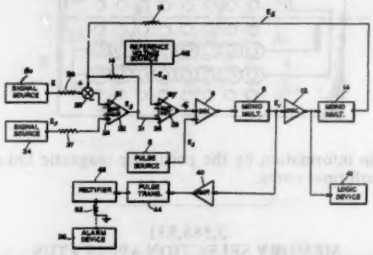


An indicating instrument failure warning circuit for energizing a failure warning mechanism. A timing circuit is responsive to a decrease in or a presence of diverse condition signals to turn off a switching transistor. A decrease in the power supply voltage causes a Zener diode to block base current to the switching transistor thereby turning it off. A voltage decrease at a power supply energizing the failure warning mechanism or turning off the switching transistor produces a failure warning.

3,588,857
FAIL SAFE MONITOR

Gunter J. Gessner, Maywood, and Donald P. Vargo, Nutley, N.J., assignors to The Bendix Corporation

Filed Nov. 24, 1967, Ser. No. 685,392
Int. Cl. G08b 23/00
U.S. Cl. 340—213 4 Claims

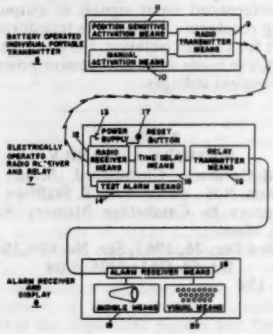


A fail safe monitor including an amplitude detector within an oscillator loop. A signal corresponding to the difference between a pair of redundant signals is compared to a reference signal. If the difference signal exceeds a predetermined threshold, the oscillator will stop and thereby cause an alarm device to be actuated. If the difference signal is less than the threshold, the oscillator will continue to oscillate and the comparator will be in the safe state. The comparator has independent dual outputs so that in the event of a failure of one output, the other output functions normally.

3,588,858
SAFETY ALARM SYSTEM

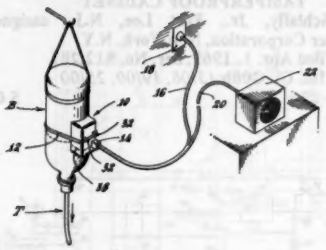
Thomas P. Demuth, Springfield, Pa., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Filed June 7, 1968, Ser. No. 735,251
Int. Cl. G08b 7/06, 25/00
U.S. Cl. 340—224 6 Claims



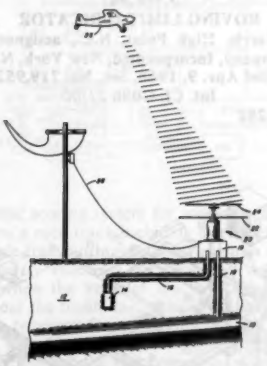
A safety alarm system designed for use by individuals working alone consisting of a radio transmitter which is activated by a position-sensitive switch and a radio receiver which activates an alarm means which indicates that the person has been injured or otherwise incapacitated. The switch is selected to activate at any position which a person would normally assume if he were injured or incapacitated, such as a prone position. The transmitter can also be equipped with a manual switch in combination with a position-sensitive switch so that it can also be used as an alarm system even when the individual is not incapacitated.

3,588,859
LEVEL DETECTOR
Frank Petree, 387 Westmoreland Drive, Idaho Falls, Idaho
Filed Apr. 21, 1969, Ser. No. 817,652
Int. Cl. G08b 21/00
U.S. Cl. 340—244 10 Claims



There is disclosed a device for attachment to the outside of an intravenous bag or bottle for indicating when the bag or bottle has become nearly empty and requires replacement. The device includes a capacitance bridge made up of distributed capacitances, two of the capacitances in the bridge being formed with the fluid in the bottle. When the fluid reaches a preselected level, the output from the bridge activates the nurses' call system or other alarm.

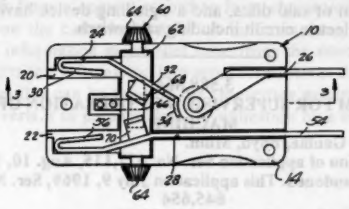
3,588,860
LONG DISTANCE VISUAL MONITOR OF ELECTRICAL CURRENT OR VOLTAGE INPUT TO AN ELECTRICAL LOAD CONDITION
Louis C. Hayward, Jr., 6116 E 58th St., Tulsa, Okla.
Filed Dec. 31, 1968, Ser. No. 788,280
Int. Cl. G08b 21/00
U.S. Cl. 340—248 4 Claims



Unattended electrical facilities such as ground, earth, water or surface equipment, e.g., pipeline cathodic protection systems, are provided with an indicator sufficiently visible for airplane patrol inspection. The visual indicator is tied into equipment and is a monitoring device operating as a function of electrical power load and indicates changes in either voltage, amperage or wattage of the facility.

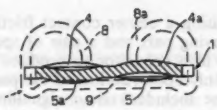
3,588,861
WARNING LIGHT FOR APPLIANCES
Paul J. Meyer, P. O. Box 193, Jefferson, Tex.
Filed Sept. 6, 1968, Ser. No. 757,968
Int. Cl. G08b 21/00
U.S. Cl. 340—252 3 Claims

A warning light for appliances including a wall plug with prong means for inserting one end of the plug in an electrical outlet socket in the wall, and socket terminals in the other end of the plug for receiving the prongs of an electrical appliance therein and a warning light in said plug with switch



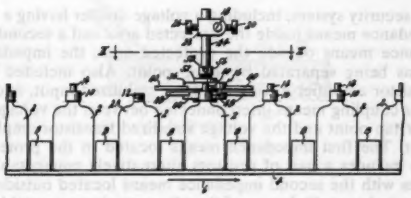
means for energizing the warning light before an electrical appliance is inserted within the plug receiving end of the plug with the warning light being disposed in series with the prong end of the plug and the plug end of the plug.

3,588,862
LAMELLAR ELECTRICAL CONNECTOR TERMINAL
Giovanni Brizzi, Via Caprera 14 (Nichelino), Torino, Italy
Filed Apr. 29, 1969, Ser. No. 820,127
Int. Cl. H01r 11/22
U.S. Cl. 339—258 5 Claims



A male electrical connector for entry into and retention in a female connector of the type comprising a baseplate with its edges rolled or folded inwardly toward each other on the same side of the baseplate but with the edges slightly clearing the baseplate, said electrical connector comprising: a lamellar strip of metal shaped at one end for entry into the female and having formed therein at least one integral protuberance from one face and at least one integral protuberance from the opposite face.

3,588,863
NO-CAP DETECTOR FOR BOTTLES ON CONVEYORS LINES
Manfred H. Guenther, 6103 E. 151 Terrace, Grandview, Mo.
Filed May 19, 1969, Ser. No. 825,611
Int. Cl. G08b 21/00
U.S. Cl. 340—259 8 Claims



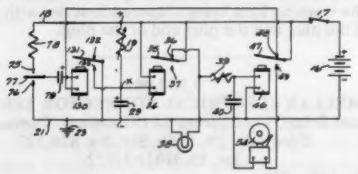
A no-cap detecting device for indicating when any bottle in a series moving along a conveyor has not had a cap applied thereto, said device comprising a pair of discs carried rotatably on a vertical axis and each having radiating spokes projecting into the bottle path so that said discs are rotated by the movement of said bottles, the spokes of the lower disc being disposed at an elevation to be engaged by the bottles

even if the bottles have no caps, and the spokes of the upper disc being disposed at an elevation to be engaged only by portions of the caps extending above the bottles themselves, a switch carried by said discs and operable to remain open so long as the discs turn concurrently, but to be closed by relative rotation of said discs, and a signalling device having an operative electric circuit including said switch.

3,588,864
SYSTEM FOR SUPERVISION OF OPERATION OF A MACHINE

Wallace E. Gaulke, Boyd, Minn.

Continuation of application Ser. No. 477,115, Aug. 10, 1965, now abandoned. This application July 9, 1969, Ser. No. 845,654
Int. Cl. G08b 21/00
U.S. Cl. 340—267 **11 Claims**

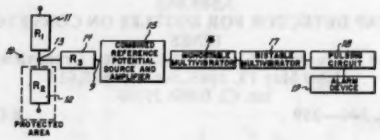


A switch comprising a center contact frictionally carried on a reversibly moving part and a pair of spaced side contacts is connected to a capacitor to produce a charging or discharging pulse only upon reversal of the part. Circuits actuated by the pulse include various signalling and control functions and may include transistor amplifiers, timing circuits, relays, and a diode network feeding a transformer with the base-emitter circuit of a transistor across the secondary.

3,588,865
SECURITY ALARM SYSTEM

Donald E. Hansen, Brookfield Center, Conn., assignor to Mosler Research Products Inc., Danbury, Conn.

Filed Aug. 31, 1966, Ser. No. 576,295
Int. Cl. G08b 13/00
U.S. Cl. 340—276 **16 Claims**

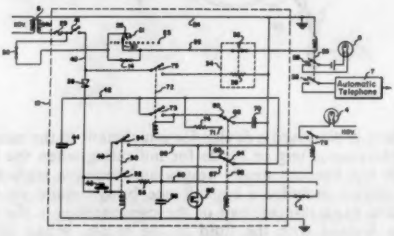


A security system, including a voltage divider having a first impedance means inside the protected area and a second impedance means outside the protected area, the impedance means being separated by a tap point. Also included is a transistor amplifier having a voltage stabilized input, and resistor coupling means interconnected between the voltage divider tap point and the voltage stabilized transistor amplifier input. The first impedance means located in the protected area includes a pair of resistors alternatively connectable in series with the second impedance means located outside the protected area. Only one of the alternatively connectable resistors of the first impedance means is variable in response to an alarm condition in the protected area, enabling the system to be selectively disabled. A third impedance means, which is selectively shuntable, is interconnected between the tap point and the first impedance means. The alternatively connectable resistors of the first impedance means are unequal in value and related to the third impedance means in a manner such that the sum of the resistance between the divider tap point and the side of the first impedance means remote from the tap point is constant regardless of which of the resistors of the first impedance means is connected in series with the second impedance means, thereby preventing the system from being defeated by resistor substitution.

3,588,866
SECURITY MONITORING SYSTEM WITH TAMPERPROOF CABINET

Hubert J. Schlafly, Jr., Fort Lee, N.J., assignor to Teleprompter Corporation, New York, N.Y.

Filed Apr. 1, 1969, Ser. No. 812,282
Int. Cl. G08b 13/08, 19/00, 25/00
U.S. Cl. 340—276 **5 Claims**

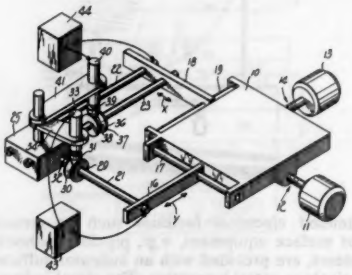


A signalling system comprising remote and local indicators. The remote indicator being actuable immediately upon the unauthorized tampering with the cover of the alarm cabinet. The local indicator being actuable upon opening of a monitoring switch (attached to door) while the remote indicator is delayed, allowing time for an authorized person to reset the system before the remote signal is given. An automatic telephone transmitter may be employed to transmit a signal or message to a remote station.

3,588,867
ROVING LIMIT INDICATOR

Richard A. Harris, High Point, N.C., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed Apr. 9, 1968, Ser. No. 719,952
Int. Cl. G08b 21/00
U.S. Cl. 340—282 **4 Claims**



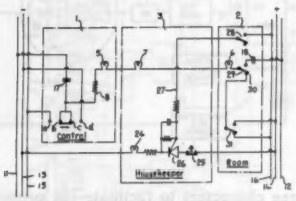
A roving limit indicator for a worktable includes a sliding member having a V-shaped groove and which is moved by a V-shaped probe on the worktable engaging the V-shaped groove in the member. When the table reaches a selected position, the probe is raised within the groove such that the table may be moved by a limited length of movement without the probe contacting the sides of the groove. If the probe contacts the sides of the groove an electrical circuit is completed which indicates that the worktable has moved to a limit.

3,588,868

STATUS SIGNALLING SYSTEM

William J. Head, West Hill, Ontario, Canada, assignor to Electro Tech Appliance Service Limited, Toronto, Ontario, Canada

Filed Feb. 27, 1969, Ser. No. 802,846
Int. Cl. H04n 7/00
U.S. Cl. 340—286 6 Claims



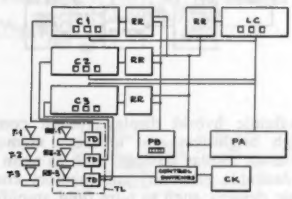
In a room status signalling system a separate signalling circuit is provided for each room, each signalling circuit including a plurality of indicator lamps in series and being selectively connectable to alternative supply terminals by manually operable switches at the room and at a central control desk. The alternative electrical supplies energize the lamps to provide a steady signal, a slow flashing signal, and a fast flashing signal.

3,588,869

AUTOMATIC SCORING SYSTEM

Eugene Emerson Clift, 719 S. Beach St. Apt. 309-B, Daytona Beach, Fla.

Filed Dec. 17, 1968, Ser. No. 784,429
Int. Cl. A63k 3/00
U.S. Cl. 340—323 11 Claims



An electronic scoring system for scoring vehicles in a plural lap race on a race track including a telemetry transmitter on each vehicle transmitting distinctive signals identifying the vehicle, telemetry receivers for receiving signals from the transmitters when the vehicles are in a selected reception range zone near the finish line, vehicle counters activated by the respective receivers for registering the laps completed by each vehicle, a lead lap counter for registering the identity of the leading vehicle and the laps completed, logic circuitry for storing certain of this registered information, and printers for producing a first printout after each lap of the vehicle number by pole position, the laps completed and elapsed time, and a second printout after every tenth lap of the order of the vehicles.

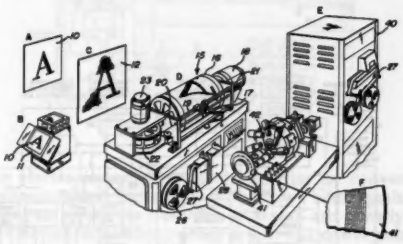
3,588,870

APPARATUS FOR PROVIDING GRAPHICAL IMAGES ON CATHODE-RAY TUBES

Edwin R. Kolb; John F. Blaha, Cleveland, and Webster C. Roberts, South Euclid, Ohio, assignors to Harris-Intertype Corporation, Cleveland, Ohio

Filed Nov. 3, 1966, Ser. No. 591,734
Int. Cl. H01f 29/70; B41b 19/08
U.S. Cl. 340—324 36 Claims

A phototypesetting method and apparatus utilizing a cathode-ray tube to display characters one at a time on the face thereof for photographic recordation employs an optical character disc having formed thereon a font of characters in the form of a plurality of binary bits represented by optical marks. The character disc is used in conjunction with control signals from a control record to form characters of various sizes on the cathode-ray tube. A buffer memory circuit accepts information in parallel form from the control record, converts this information into serial form, stores this information until it can be used by the typesetting system, and then reconverts it to parallel form for utilization by a decoder cir-



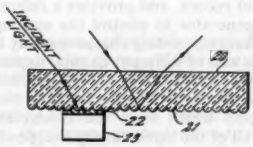
cuit which provides the signals necessary for the control of various typesetting operations and for the selection of the characters to be displayed. Electronic circuits compensate for the nonlinearities in the cathode-ray tube to permit characters to be formed on the face thereof in properly spaced relation and without distortion regardless of their position on the tube. Other electronic circuits are employed for the generation of the characters as controlled by the binary bits on the character disc, for control over the cathode-ray tube intensity, and for leading of the photographic recording medium.

3,588,871

CONSTANT WRITING RATE DISPLAY CONTROL APPARATUS

James T. Shiosaki, Azusa, Calif., assignor to Honeywell, Inc., Minneapolis, Minn., a corporation of Delaware

Filed Mar. 12, 1969, Ser. No. 806,366
Int. Cl. H03k 13/04
U.S. Cl. 340—324A 4 Claims

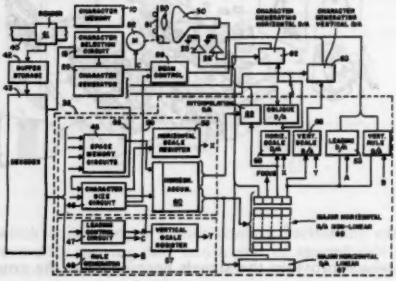


A function generator for converting digital signals indicative of quadrature components of a vector into analog signals indicative of the components. The function generator produces a time varied ramp, the time of which is a function of the approximate vector addition of the digital input signals. The ramp always varies between the same two voltages so that when it is applied to a pair of digital to analog converters having the digital signal inputs, the resulting outputs will produce constant writing rate vector signals.

3,588,872
POINT SIZE, COMPUTATION AND EXPOSURE CONTROL DEVICE FOR A CHARACTER DISPLAY APPARATUS

Edwin R. Kolb, University Heights, and Charles H. Grace, Brecksville, Ohio, assignors to Harris Intertype Corporation, Cleveland, Ohio

Filed Mar. 4, 1968, Ser. No. 710,351
Int. Cl. H01j *29/70*
U.S. Cl. 340—324 **10 Claims**



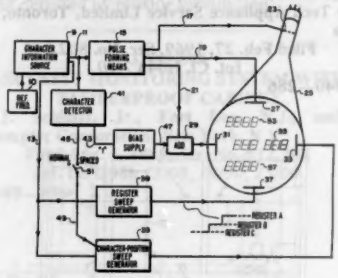
A character memory, including several fonts of characters each of a different point size, supplies characters generating data to form characters on an energy responsive surface, such as the face of a cathode-ray tube, in response to instructions from a control record. The control record selects the font and the character within the font to be displayed and the size of the character to be displayed independent of its size as recorded in the memory within the selected font. Each character is formed by moving a beam of energy to a plurality of predetermined locations relative to each other and energizing the beam for a predetermined duration on the energy responsive surface to form a series of spots, and each character is formed to the point size required by the control record by a circuit which analyzes the point size of the character stored in the character memory, compares this information with the point size of the character to be displayed from the control record, and provides a reference voltage to the character generator to control the spacing between adjacent spots. Thus, typesetting characters may be displayed at different speeds and of different quality, depending upon the use for which the output of the phototypesetting system is to be employed. A circuit is also provided to control the duration of the spots which form the characters so that the characters are all of the same density independent of the size of the character displayed or the point size of the character memory selected.

3,588,873
INFORMATION DISPLAY APPARATUS

Thomas E. Osborne, San Francisco; Kay B. Magleby, Los Altos Hills, and Joseph A. Lukes, Belmont, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 12, 1968, Ser. No. 774,821
Int. Cl. G08b *23/00*
U.S. Cl. 340—324A **7 Claims**

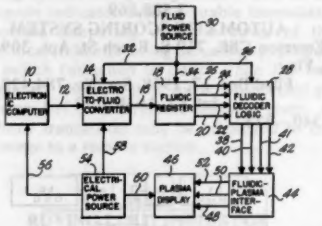
A cathode-ray display tube and associated sweep circuitry displays alphanumeric characters which are centered between adjacent characters and which are separated into groups of three characters to facilitate the prompt recognition of punctuation in a long series of characters.



3,588,874
PLASMA-FLUIDIC HYBRID DISPLAY

Edwin H. Hilborn, Framingham, and Hans B. Bullinger, Peabody, Mass.

Filed Oct. 11, 1968, Ser. No. 766,697
Int. Cl. H01j *17/22, 61/28*
U.S. Cl. 340—324 **14 Claims**



A plasma-fluidic hybrid display system combining the desirable high brightness and inherent memory characteristics of plasma display devices, such as neon tubes, with the equally desirable reliability and memory characteristics of fluidic logic devices, such as pure fluid amplifiers with no moving parts. System comprises an array of plasma cells, an electrical source for energizing the array, a fluid pressure source for pressurizing same and a fluidic logic circuit connected to each cell. Fluidic circuit changes the pressure within each cell and thus permits or suppresses ionization within selected cells.

The invention described herein was made by employees of the United States Government and may be manufactured and used by or for the Government for governmental purposes without the payment of any royalties thereon or therefor.

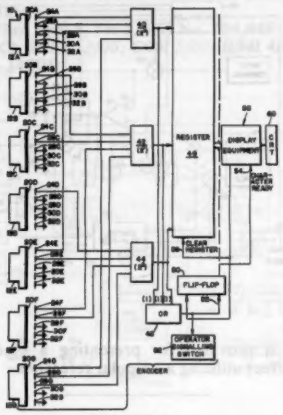
3,588,875
CHARACTER ENCODER

William D. Gabor, Amherst, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Continuation-in-part of application Ser. No. 496,031, Oct. 14, 1965, now abandoned. This application Oct. 10, 1966, Ser. No. 598,558
Int. Cl. H04l *3/00;* **H03k** *13/243, 13/256*
U.S. Cl. 340—347 **32 Claims**

A keyboard encoder comprises a set of keys. Each key is in juxtaposition with one or more field-responsive elements associated with that key, the outputs of the field-responsive elements being conveyed to output terminals of the encoder. Actuation of a key alters the field to which the elements associated therewith respond. The number of elements associated with each key and the connections of these elements to the output terminals correspond to the output code for the

character represented by the key. Consequently, the responses of the field-responsive elements to actuation of a key pro-



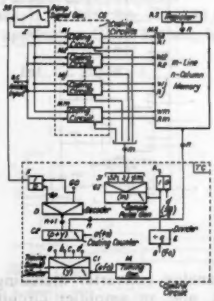
vide a directly encoded representation of the corresponding character at the output terminals.

3,588,876

ENCODER FOR WIDE BAND SIGNALS

Andre Edouard Joseph Chatelon, Montrouge; Claude Paul Henri Lerouge, Montgeron, and Herve Jean Pierre Marie Louboutin, Palaiseau, France, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 7, 1967, Ser. No. 666,164
Int. Cl. H03k *13/02*
U.S. Cl. 340—347 10 Claims



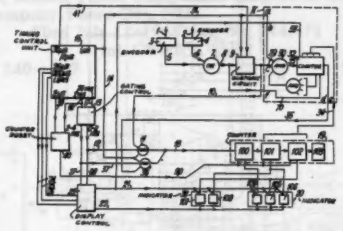
m sample and hold, amplitude comparison and logic circuits are activated by timing signals during the rise time of cyclic ramp signals to produce write and read signals. Each circuit produces a write signal when the amplitudes of an analog signal and one of the ramp signals are equal and simultaneously the associated ones of the timing signals are absent in the rise time of said one of said ramp signals to transfer the count of the *n* least significant binary weighted stages of an (*n*+1) stage coding counter to associated columns of an *m*-line, *n*-column memory and a read signal when the associated ones of the timing signals are present in the rise time of the next succeeding one of said ramp signals to transfer the stored code to external circuits.

3,588,877

ANALOGUE-TO-DIGITAL CONVERTERS

Arthur Thomas Keefe, London, England, assignor to Evershed & Vignoles Limited, Chiswick, London, England

Filed Dec. 19, 1967, Ser. No. 691,898
Claims priority, application Great Britain, Dec. 19, 1966, 56766/66
Int. Cl. H03k *13/20*
U.S. Cl. 340—347 5 Claims



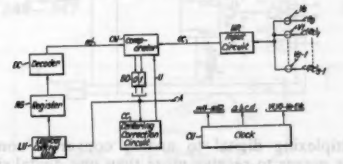
In an electronic analogue-digital converter for converting coarse-fine analogue signals into digital form, both signals are converted to pulses the durations of which are linearly related to the coarse and fine voltage levels. The coarse pulse is extended by a bias duration equivalent to a part of a unit. The fine pulse gates a clock pulse train into a counter and the total count is decoded and subtracted from the extended coarse pulse. The resultant coarse pulse gates a clock train into a counter. The coarse count or units total and the fine count or remainder are displayed on indicators. The bias or offset applied to the coarse signal avoids ambiguity in its units representation when the fine signal has been subtracted. The coarse and fine signals may be derived from potentiometers in a liquid level gauge.

3,588,878

CENTERING ARRANGEMENT FOR A TERNARY CODER

Michel L. Avignon, Neuilly-sur-Seine, France, and Joseph L. Mader, Dietlikon, Switzerland, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Dec. 22, 1967, Ser. No. 692,927
Claims priority, application France, Jan. 12, 1967, 90,861
Int. Cl. H03k *13/24*
U.S. Cl. 340—347 10 Claims



A calibration voltage is periodically coupled to a feedback comparison ternary coder during calibration time to generate a ternary calibration code of all ternary 1 digits when the coder is properly centered. An arrangement examines each ternary digit starting from the most significant digit to detect a deviation from the desired calibration code represented by the first ternary digit different from ternary 1 and appropriately adjusts the reference voltage of the coder to compensate for this deviation.

3,588,879

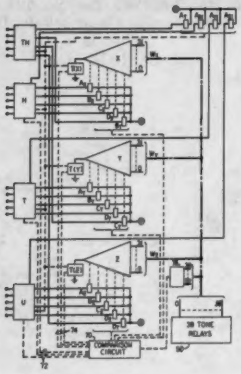
MULTIDIGIT CODE TRANSLATOR

Barry Litofsky, Matawan, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 2, 1968, Ser. No. 718,135
Int. Cl. G06f *5/02*
U.S. Cl. 340—347 5 Claims

A code translator is developed for concurrently translating multidigit decimal numbers in the two-out-of-five code to

three tones-out-of-39 tones for simultaneous modulation of a carrier signal. The translator includes four relay converters for converting input code words to intermediate code words



that drive cells of switching trees. Auxiliary control circuits are arranged to enable three switching trees to control output tone relays and to complement the state of selected cells of the switching trees.

3,588,880

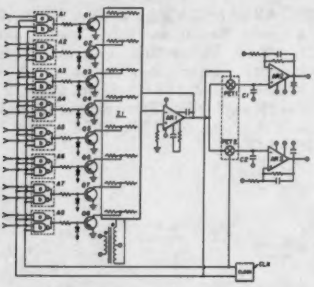
MULTIPLEXED DIGITAL TO AC ANALOG CONVERTER

Robert D. Gross, North Caldwell; Marvin Masel, West Englewood, and Peter K. Scholl, West Paterson, N.J., assignors to Singer-General Precision, Inc., Little Falls, N.J.

Filed Oct. 24, 1968, Ser. No. 770,166

Int. Cl. H03k *13/04*

U.S. Cl. 340—347DA **4 Claims**



A multiplexing digital to analog converter comprising: input gate means to receive more than one digital signal; an output section coupled to the input gate means; a reference signal source coupled to the input gate means to convert each digital signal to AC form and connections to feed said converted signal to the output section; sampling means to rapidly sample the changing values in said output section for storage; capacitor storage means coupled to the output section for storing said values thereon; and, output filter and amplifier means fed by said capacitor storage means to provide smoothly changing AC outputs corresponding to each of said digital signals.

3,588,881

CYCLIC DEVICE FOR ANALOG TO DIGITAL CONVERSION

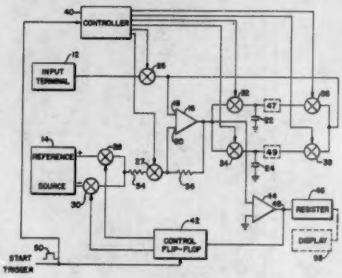
Bernard M. Gordon, Magnolia, Mass., assignor to Gordon Engineering Company, Wakefield, Mass.

Filed July 22, 1969, Ser. No. 843,485

Int. Cl. H03k *13/17*

U.S. Cl. 340—347 **23 Claims**

In a circulating or cyclic device, for converting analog data to digital form, a capacitive transfer technique is provided for accomplishing such conversion. In addition, a capacitive-reference voltage switching technique, particularly for cyclic



converters is provided for presenting a bipolar reference switching effect utilizing a unipolar reference.

3,588,882

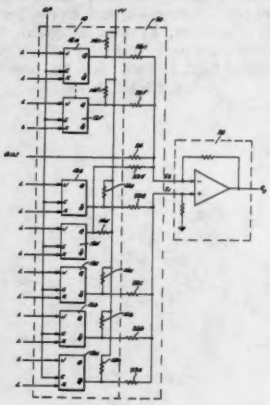
DIGITAL-TO-ANALOG CONVERTER

John A. Propster, La Mirada, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Aug. 4, 1969, Ser. No. 847,089

Int. Cl. H03k *13/02, 13/04*

U.S. Cl. 340—347 **12 Claims**



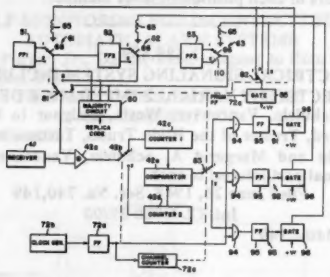
A digital-to-analog converter including a register, a resistive network, and an amplifier circuit. The register includes a first set of flip-flops that provides digital output signals in a repetitious, ascending order, binary count sequence and a second set of flip-flops that provides individual output signals corresponding to the individual repetitions of the first set of flip-flops. The resistive network includes a plurality of binary weighted resistors that are coupled to receive the output signals provided by the first set of flip-flops and a plurality of equally weighted resistors that are coupled to receive the output signals provided by the second set of flip-flops. All but one of the binarily weighted resistors have a common output terminal for providing a first summing signal and all of the equally weighted resistors and one of the binarily weighted resistors have a common output terminal for providing a second summing signal. An amplifier circuit is coupled to receive the first summing signal and the second summing signal for providing an analog output signal being differentially related to the received summing signals.

3,588,883

ENCODER/DECODER SYSTEM FOR A RAPIDLY SYNCHRONIZABLE BINARY CODE

James E. Webb, Administrator of the National Aeronautics and Space Administration with respect to an invention of Tage O. Anderson, Arcadia, Calif., and Jack J. Stiffler, Concord, Mass.

Filed Feb. 9, 1968, Ser. No. 704,446
Int. Cl. H03k *13/00*; G06f *5/00*; H04l *4/00*
U.S. Cl. 340—347DD 10 Claims



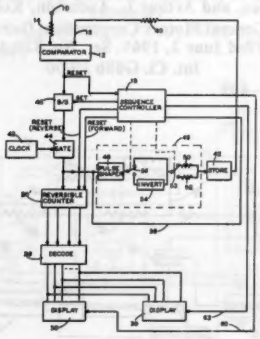
An encoder/decoder system is disclosed, designed to generate a binary code which is a function of the outputs of a plurality of bistable elements. The generated code is assumed to be transmitted to and received by a receiving unit, where a replica code is generated. To generate the replica code in phase with the received code, the outputs of each of a plurality of bistable elements are correlated during a different decision-making period with the received code. At the end of the period, based on the correlation results, a decision is reached which output of the element is to be used. After all the decision-making periods, the chosen outputs of all the elements, when supplied to a majority circuit, produce a replica code, in phase with the received code.

3,588,884

ANALOG-TO-DIGITAL CONVERTERS

Umar Quereshi, and Thomas Richard Fortescue, Farnborough, England, assignors to The Solartron Electronic Group Limited, Farnborough, England

Filed May 17, 1968, Ser. No. 730,038
Claims priority, application Great Britain, May 23, 1967, 23,981/67
Int. Cl. H03k *13/17*
U.S. Cl. 340—347 13 Claims



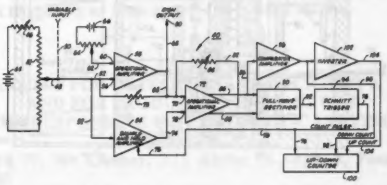
In a successive approximation digital voltmeter the digital logic is time shared between successive ranges. The comparison signal is built up by analog integration of the contributions switched in by the logic in each range, such contributions being scaled down by a factor of 10 for each successive range. Number tubes are used to display the digits for the successive ranges as determined by the logic but again the logic controlling the tubes is time shared, reliance being placed upon persistence of vision to synthesize the complete digital readout.

3,588,885

APPARATUS FOR INDICATING GRAPHIC COORDINATE VALUES

Doyle H. Schaal, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed July 12, 1968, Ser. No. 744,471
Int. Cl. H03k *13/02*
U.S. Cl. 340—347 12 Claims



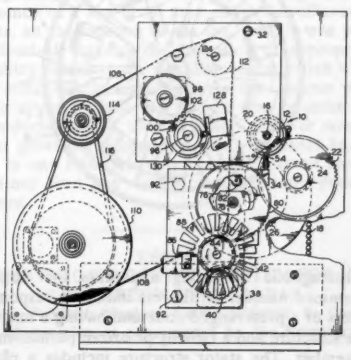
Apparatus for sensing and maintaining an accurate count of coordinate values of a plot or graph, the apparatus consisting of variable potential means for equating an electrical value to the graph coordinate under consideration and differential amplifier means for generating an output indicative of change of the electrical values, the amplifier output then being employed through pulse and counting circuitry to register a count indicative of unit change of the electrical value. The amount of unit change required to actuate the pulse and counter circuitry is variable over wide range to provide ready adjustment of the apparatus for use over various graduated scales.

3,588,886

SHAFT ENCODER HAVING TAPE PUNCH AND SWITCH READOUT MEANS ACTUATED ON TWO DIFFERENT PORTIONS OF SAME ENCODER CAM

Harold G. Lee, Portland, Oreg., assignor to Leupold & Stevens Instruments, Inc., Beaverton, Oreg.

Filed Apr. 7, 1969, Ser. No. 814,112
Int. Cl. H03k *13/02*; G08c *9/00*
U.S. Cl. 340—347 14 Claims



A shaft encoder apparatus is described in which two readout means, such as tape punch and telemetering switch, are actuated by engagement with two different portions of the same encoder cams displaced by an angle of 90°. The encoder cams are arranged in groups to form a binary coded decimal counter with each group of cams corresponding to a different digit of the counter reading. Adjacent cam groups

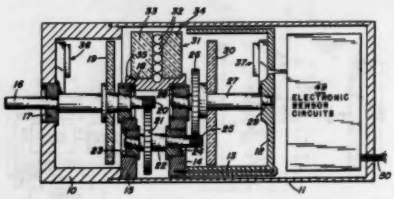
are coupled together through transfer gears which are vibrated during the readout operation to move the counter cams into an unambiguous counter reading immediately prior to locking the counter so that a counter reading can be taken by the readout means.

3,588,887

OPTICAL ANALOG-TO-DIGITAL CONVERTER HAVING DUAL ENCODER DISCS

Arney Landy, Jr., Saint Paul, Minn.

Filed May 6, 1969, Ser. No. 822,244
Int. Cl. G08c *9/06, 9/00*
U.S. Cl. 340—347P **6 Claims**



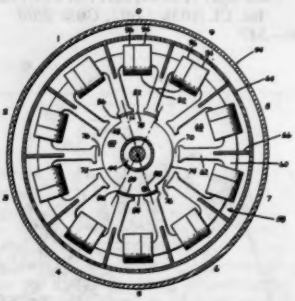
An optical analog-to-digital converter having an analog shaft input driving two encoder discs at a ratio of 64 to 1 with a photocell mask of lead and lag rows of windows between each encoder disc and light sensitive photocells positioned such that the photocells sense the position of the encoder windows in both lag and lead positions by switching the lead and lag photocell circuits in accordance with switching from the least significant bit to produce binary "1" and "0" output signals for each optical track of the two encoder discs to correlate the shaft input rotated position.

3,588,888

ELECTROMAGNETIC INDICATING APPARATUS

Phillip L. Harden, Fort Wayne, Ind., assignor to Bowmar Instrument Corporation, Fort Wayne, Ind.

Filed July 2, 1969, Ser. No. 838,557
Int. Cl. G08b *5/00*
U.S. Cl. 340—378R **39 Claims**



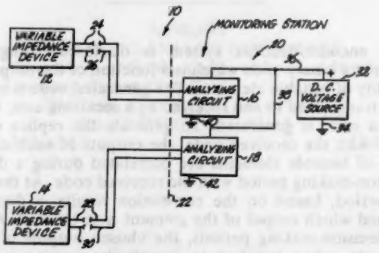
Electromagnetic indicating apparatus for displaying a predetermined number of discrete indicia in response to the characters of a prearranged code and having a magnetic stator core structure and a radially polarized permanent magnet rotor member. The stator structure includes a plurality of polar projections or teeth which define a bore for receiving the rotor member, and a plurality of coils arranged selectively to energize one preselected adjacent pair of polar projections with one magnetic polarity and another preselected adjacent pair with the opposite magnetic polarity. The rotor member has peripheral surface portions which define first radial airgaps with the polar projections and a pair of spaced pole face portions which project radially outwardly from the surface portions and respectively define second radial airgaps with the stator polar projections and which are narrower than the first airgaps, the rotor pole face portions respectively having an angular extent generally corresponding to the angular extent of each adjacent pair of stator polar projections and being respectively generally aligned with the oppositely polarized adjacent pairs of stator polar projections in each position of the rotor member. The rotor member is polarized on a magnetic axis which extends through the pair of pole face portions and which is generally aligned with one stator polar projection respectively of the oppositely polarized adjacent pairs in each position of rotor member.

3,588,889

ELECTRICAL SIGNALING SYSTEM INCLUDING SELECTIVELY VARIABLE IMPEDANCE DEVICE

Joseph Schulein, Vancouver, Wash., assignor to H. Dutton Hayward, Trustee of the Hilda Trusts, Tacoma and Joseph Schulein and Margaret A. Schulein, Vancouver, Wash., fractional part interest to each

Filed June 26, 1968, Ser. No. 740,149
Int. Cl. G08b *29/00*
U.S. Cl. 340—149 **10 Claims**



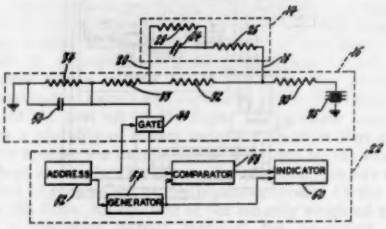
An electrical signaling system including a nonvoltage-generating changeable value impedance device which is actuatable to produce at a pair of output terminals different select impedance values, and an analyzing circuit remote from and connected to the device which produces different output signals in response to different impedance values produced at the output terminals of the device. A single DC voltage source located adjacent the analyzing circuit supplies all electrical power required in the system.

3,588,890

RESISTANCE SENSING SUPERVISORY SYSTEM

Ronald W. Cox, and Arthur L. Anderson, Kokomo, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed June 2, 1969, Ser. No. 829,462
Int. Cl. G08b *29/00*
U.S. Cl. 340—409 **3 Claims**



A supervisory system is provided for monitoring a plurality of remote stations from a central station. A supervisory circuit located at each of the remote stations is connected with a corresponding monitoring circuit located at the central sta-

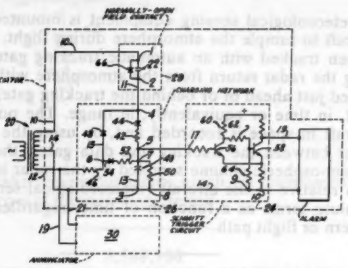
tion through a pair of conductors. The supervisory circuits each include a switching device operable between an opened position and a closed position. A control circuit located at the central station and connected to each of the monitoring circuits detects closed switch, opened switch, ground, short circuit and open circuit conditions existing in each of the supervisory circuits located at the remote stations. In addition, the control circuit detects a failure of any one of the system components.

3,588,891

SELF-MONITORING FIELD-CONTACTS FOR AUTOMATIC ALARM SYSTEMS

Lester H. Porter, Jr., Dallas, Tex., assignor to Beta Corporation, Dallas, Tex.

Filed Mar. 7, 1968, Ser. No. 711,360
Int. Cl. G08b *29/00*
U.S. Cl. 340—409 **4 Claims**



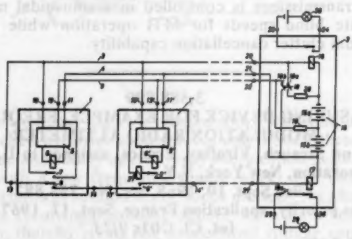
A self-monitoring field-contact circuit for providing an alarm in automatic alarm or annunciator systems should the wires to the field-contacts become broken or shorted. A unipolarity operated switching circuit between the field-contact to be monitored and an alarm indicator unit is triggered by a capacitor charging circuit in response to either (a) the closing of a normally open field-contact because of a malfunction of the monitored equipment, or (b) the breakage (opening) or shorting out of the field-contact wires.

3,588,892

TEST OF PARALLEL ALARM UNITS

Andreas Scheidweiler, Stafa, Switzerland, assignor to Cerberus, A. G., Mannedorf, Switzerland

Filed Dec. 18, 1968, Ser. No. 784,655
Claims priority, application Switzerland, Dec. 29, 1967, 18340/67
Int. Cl. G08b *17/12, 29/00*
U.S. Cl. 340—410 **7 Claims**



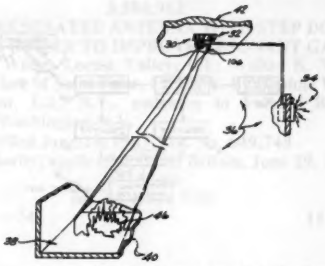
An improved signal installation of a plurality of alarm units is disclosed, the signal installation enabling the operational readiness of each alarm unit to be checked in a simple and reliable manner. The basic signal installation itself comprises a plurality of individual alarm units, each alarm unit being connected in parallel preferably across a pair of supply conductors leading to some central monitoring station. Each alarm unit is preferably of the type wherein, at the occurrence of an alarm condition, an electrical contact is closed therein essentially shorting the supply conductors. For purposes of checking the operational readiness of the plurality of alarm units, alarm conditions are electrically simulated at each alarm unit. When each alarm unit responds to the checking operation, and additional electrical contact associated with each alarm is closed. The additional or checking electrical contacts are connected in a separate series circuit leading back to the central monitoring station. If all alarms of the plurality of alarm units have properly responded to the checking operation, then the separate series circuit comprising all the additional electrical contacts will be completed. Should one of the plurality of alarm units fail to respond, then its associated additional electrical contact would remain in an open condition thus breaking the series circuit triggering an indicator at the central station.

3,588,893

APPARATUS FOR DETECTING AND LOCATING A FIRE AND FOR PRODUCING AT LEAST ONE CORRESPONDING INTELLIGENCE-CARRYING OUTPUT SIGNAL

Edward W. Mc Closkey, 271 Alpine St., Apt. 4, Pasadena, Calif.

Filed Oct. 25, 1968, Ser. No. 770,581
Int. Cl. G08b *17/00*
U.S. Cl. 340—418 **21 Claims**



An apparatus for detecting and locating a fire and for producing at least one corresponding intelligence-carrying output signal (or a plurality thereof) indicating the detection and presence of a fire in an area under surveillance by the apparatus, an the location of the fire, and, in one preferred form, effectively causing the operation of appropriate fire extinguishing means in the precise location which will result in most effectively extinguishing the fire. In one preferred form, the apparatus will also operate one or more warning alarm producing means, located either locally or remotely, in a manner providing information as to the exact location of the fire. In one form this may be done without any special wiring other than the conventional, already present AC power lines.

3,588,894

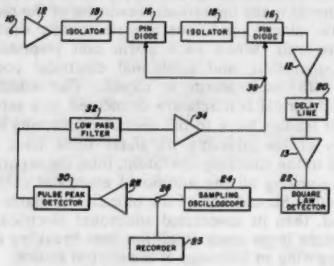
AUTOMATIC GAIN CONTROL SYSTEM FOR HIGH-RANGE-RESOLUTION RADAR

Michael J. Prickett, Santee, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Aug. 20, 1969, Ser. No. 851,685
Int. Cl. G01s *9/23*; H04b *1/16*
U.S. Cl. 343—5 **7 Claims**

An automatic gain control (AGC) system for receivers used in high-range-resolution radar is disclosed. Received, very short radar echos are time-compressed by means of a microwave delay line, rectified by means of a square law detector, and stretched with respect to time by means of a sampling oscilloscope. The resultant stretched pulses are fed

back through a threshold device, a pulse peak detector, and a low-pass filter to provide a control voltage to PIN diodes



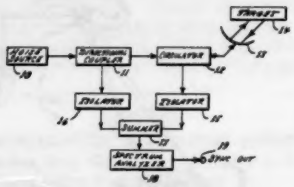
which function as voltage controlled attenuators in the forward signal path.

3,588,895

SYNTHETIC APERTURE ANALYSIS RADAR

William B. Goggins, Jr., Dayton, Ohio, and Joseph L. Poirier, Chelmsford, Mass., assignors to the United States of America as represented by the Secretary of the Air Force

Filed Sept. 19, 1969, Ser. No. 859,445
Int. Cl. G01s 9/02
U.S. Cl. 343—5R **3 Claims**



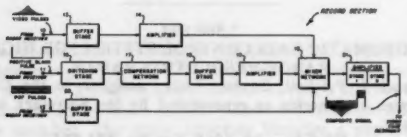
A synthetic aperture analysis radar system in which the transmitted and received signals are noise signals. The return signal is added to a reference signal derived from the transmitted signal. Under certain conditions the power spectrum of the sum signal is modulated. Synthetic aperture processing can then be performed since the power spectrum is essentially coherent.

3,588,896

RADAR COMPOSITE VIDEO PROCESSOR

Robert T. Duarte, Reeds Ferry, N.H., assignor to the United States of America as represented by the Secretary of the Navy

Filed Aug. 25, 1969, Ser. No. 852,756
Int. Cl. G01s 7/30, 9/02
U.S. Cl. 343—5 **7 Claims**



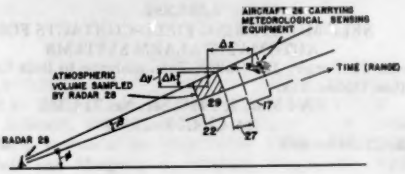
A system for combining a plurality of informational radar signals into a single composite signal which is then recorded on one channel of a magnetic tape. The original signals are then reconstructed from the composite signal and applied to a radar display scope which renders a presentation identical to that of the original video signal.

3,588,897

METHOD AND APPARATUS FOR THE SIMULTANEOUS PROBING OF THE ATMOSPHERE BY RADAR AND METEOROLOGICAL SENSORS

Thomas G. Konrad, Silver Spring, Md., assignor to the United States of America as represented by the Secretary of the Navy

Filed July 3, 1969, Ser. No. 838,925
Int. Cl. G01s 9/14; G01w 1/08
U.S. Cl. 343—6 **10 Claims**



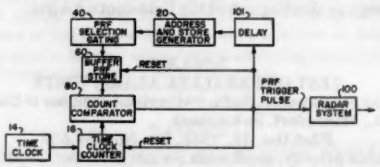
Meteorological sensing equipment is mounted aboard an aircraft to sample the atmosphere during flight. The aircraft is then tracked with an automatic tracking gate while sampling the radar return from the atmosphere with a data gate placed just ahead of or behind the tracking gate; i.e., the aircraft, in time or equivalently, in range. The position of the aircraft in space is recorded and, by using the known time offset between the tracking and data gates, the position of the atmospheric volume sampled by the radar is also known both relative to the aircraft (meteorological sensors) and in absolute terms as a function of time, regardless of aircraft pattern or flight path.

3,588,898

APPARATUS AND METHOD FOR IMPROVING THE VELOCITY RESPONSE OF A MTI RADAR BY SINUSOIDALLY VARYING THE INTERPULSE PERIOD

Edward C. Watters, Jr., Annapolis, and Thomas M. Moore, Severna Park, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 1, 1968, Ser. No. 772,701
Int. Cl. G01s 9/42
U.S. Cl. 343—7.7 **19 Claims**



A variable pulse-repetition frequency generator for moving target indicator radars wherein the time interval between radar transmissions is controlled in a sinusoidal manner to eliminate blind speeds for MTI operation while providing maximum clutter cancellation capability.

3,588,899

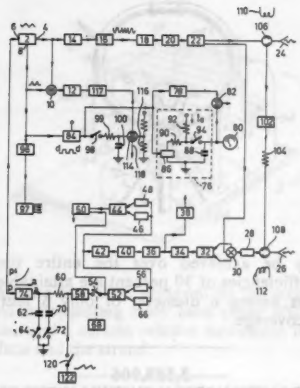
MEASURING DEVICE FOR EXAMPLE, FREQUENCY-MODULATION RADIO ALTIMETER

Raymond Strauch, Viroflay, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 10, 1968, Ser. No. 758,882
Claims priority, application France, Sept. 11, 1967, 120554
Int. Cl. G01s 9/23
U.S. Cl. 343—14 **5 Claims**

A frequency modulated, continuous wave radio altimeter with means for automatically adjusting linear and nonlinear feedback circuits controlling the amplitude and frequency of triangular modulating wave signals used in range measurements during programmed calibration time periods that are interposed between operational time periods when range measurements are made. The signals transmitted to and

received from a target during the measuring periods are passed through a known delay line during the calibration



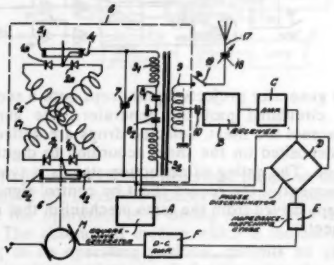
periods to make these adjustments which are maintained during the subsequent measurement period.

3,588,900

RADIO COMPASS AND MEANS FOR CONTROLLING ITS MOTOR

Gaston Raoul Salmet, 15 Avenue des Ailantes, Saint-Maur, Val De Marne, France

Filed Dec. 27, 1968, Ser. No. 787,344
Claims priority, application France, Jan. 2, 1968, 134,547
Int. Cl. G01s *3/42*
U.S. Cl. 343—117 **12 Claims**



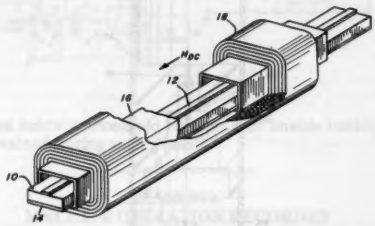
A radio compass has two crossed loops with outputs normally blocked by series capacitances and diodes, these loops being made alternately operative by energization in phase opposition with a low frequency square wave. The combined output currents generated in the loops are fed to a phase discriminator receiving the same square wave as a reference oscillation, thereby giving rise to a control voltage applied to a reversible drive motor for the rotatable loop array. Signals picked up by a juxtaposed omnidirectional antenna may be intermittently superimposed upon the loop output by a manual switch or by a train of monitoring pulses to provide an unambiguous indication of the origin of the received radiation, in the latter case the monitoring pulses may block the input circuit to the motor during operation of a balanced zero indicator responsive to the combined output signals.

3,588,901

MINIATURIZED FERRITE PHASE SHIFTERS FOR ELECTRONICALLY STEERED ANTENNA ARRAYS

Daniel C. Buck, Hanover, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 17, 1969, Ser. No. 842,653
Int. Cl. H03h *7/36;* **H01p** *3/08;* **H01g** *3/26*
U.S. Cl. 343—741 **9 Claims**



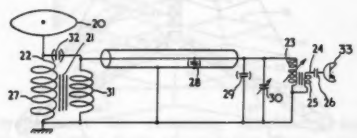
Described are miniaturized analog X-band microstrip ferrite phase shifters particularly adapted for use in airborne antenna arrays. Also described is a novel antenna array assembly itself. The elements containing the phase shifters are designed into half-wavelength spacing to achieve a two-axis scan and comprise microstrip transmission lines deposited on thin ferrite films surrounded by suitable actuating coils.

3,588,902

SHORT RESONATED ANTENNA WITH STEP DOWN TRANSFORMER TO IMPROVE RESONANT GAIN

Edward N. Willie, Locust Valley, L.I.; Walter K. Volkers, deceased, late of Sand Point, L.I., N.Y. by Daphne Volkers, Sand Point, L.I., N.Y., assignors to Volkers Research Inc., Port Washington, N.Y.

Filed June 28, 1967, Ser. No. 649,748
Claims priority, application Great Britain, June 29, 1966, 29152/66
Int. Cl. H01q *9/00*
U.S. Cl. 343—745 **11 Claims**



A receiver having a short resonated antenna and a short length of transmission line between the antenna and the first amplifier stage in which high resonant gain efficiency is accomplished with the aid of a suitably arranged indirectly tuned antenna transformer.

3,588,903

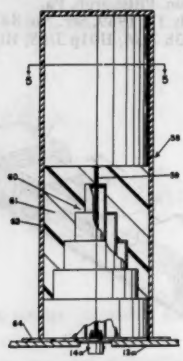
VERTICAL RADIATOR ANTENNA STRUCTURE WHICH ELIMINATES THE NECESSITY OF A GROUND PLANE

William Hampton, Akron, Ohio, assignor to Goodyear Aerospace Corporation, Akron, Ohio

Filed Apr. 3, 1968, Ser. No. 718,522
Int. Cl. H01q *9/22*
U.S. Cl. 343—792 **4 Claims**

A high frequency antenna which comprises a two section vertical radiator, (cut to the median frequency) approximately five-eighths wavelength long at its highest operating frequency, one-half wavelength at its lowest operating frequency, which is end-fed by a coaxial feed through the base of the radiator. The power supplied to the coaxial feed is fed so as to be resonant to the upper and lower frequency limits of the radiator thereby shifting the current lobe away from the base, in effect maintaining near zero current at the base of the radiator. This produces a radiator which is not

dependent upon a ground plane and which pattern while vertically polarized is horizontal and omnidirectional. In effect,



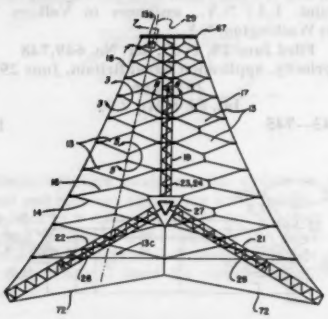
the antenna acts as a dipole at lowest frequency and a displaced one-fourth wave section at highest frequency.

3,588,904

ANTENNA CONSTRUCTION WITH LOW Q RADIATORS

Harry C. Broyles, Sunnyvale, Calif., assignor to Granger Associates, Palo Alto, Calif.

Filed Oct. 24, 1968, Ser. No. 770,285
Int. Cl. H01q *11/10*
U.S. Cl. 343—792.5 **6 Claims**



An antenna construction wherein the radiator elements of a radiating array include side-by-side elongated portions which have been spread apart intermediate their ends so that the separation between the two elongated portions of each radiator element is at its greatest in a general region midway between the cable-supported outer and inner ends of the radiating element.

3,588,905

WIDE RANGE TUNABLE TRANSMITTING LOOP ANTENNA

John H. Dunlavy, Jr., 9003 Greenwood Terrace, Greenbelt, Md.

Filed Oct. 5, 1967, Ser. No. 673,052
Int. Cl. H01q *21/00, 7/00*
U.S. Cl. 343—856 **8 Claims**

This specification discloses a loop antenna which employs a novel and unique feed scheme permitting a tuning range of up to 10:1 with a nearly constant input impedance and high efficiency. The antenna is useful for both receiving and high power transmitting applications and should find particular usefulness in the high frequency range of 2—30 MHz. The antenna consists of a single turn tuned primary fed by a small, single turn untuned secondary. By proper adjustment of the ratio between the diameters of the primary and secondary loops, an accurate match to a low impedance cable (50

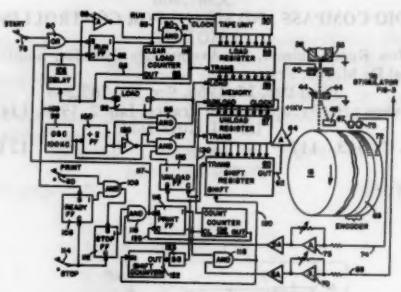
ohms) may be achieved over the entire tuning range. Minimum efficiencies of 30 percent are attainable with practical designs having a diameter of only 5 feet for 3—15 megahertz coverage.

3,588,906

IMAGE CONSTRUCTION SYSTEM WITH CLOCKED INFORMATION INPUT

Russell H. Van Brimer, and Fred E. Culp, Chillicothe, Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Oct. 18, 1968, Ser. No. 768,763
Int. Cl. G01d *15/18*; G06k *1/12*
U.S. Cl. 346—1 **7 Claims**



A drop generator projects liquid drops onto a record sheet which is circulated past the generator. The generator is scanned across the sheet. Selected drops are deflected away from or deposited on the sheet according to digital control information. The gating of deflection signals is synchronized with movement of the record sheet by control signals from a fiducial tape driven from the same mechanism that moves the record sheet.

3,588,907

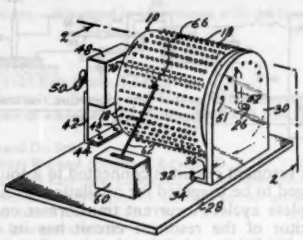
SELF-ERASING, SHORT-TIME MEMORY DATA RECORDER

Robert T. Luger, 855 Central Building, Seattle, Wash.

Filed Nov. 29, 1968, Ser. No. 779,902
Int. Cl. G01d *9/12*
U.S. Cl. 346—1 **11 Claims**

This invention is for a recorder which indicates for a relatively short period of time a physical state such as atmospheric pressure, temperature, and relative humidity. There is a moving exterior surface having outwardly directed protrusions or guides to position a flexible strand. This flexible strand is the indicator for the temperature, the atmospheric pressure and the relative humidity. Relative motion between the exterior surface and the strand is prevented by these protrusions or guides. This relative motion is prevented in directions normal to the strand, whereas motion is affected between the exterior surface and the strand in the direction

along the strand at every point of contact of the surface and the strand. The recorder is self-erasing so that an observer does not have to replenish ink, recording paper and the like. For relatively short periods of time, say twelve to twenty-four hours, it is possible to note the variation in the physical state undergoing measurement and recording.



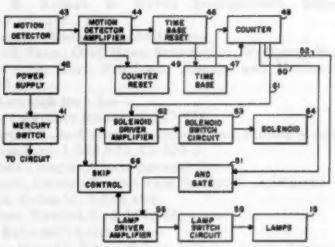
The self-erasing feature is achieved by the strand and the exterior surface separating from each other after a certain period of time and a certain relative movement between the exterior surface and the strand.

3,588,908

BOREHOLE INSTRUMENT

James M. Lindsey, Houston, Tex., assignor to Sperry Sun Well Surveying Company, Sugar Land, Tex.

Filed Nov. 15, 1968, Ser. No. 776,191
Int. Cl. E21b *47/022*; G01d *9/42*
U.S. Cl. 346—33 **11 Claims**



The particular embodiment described herein as illustrative of one form of the invention utilizes a motion sensing device to control the operation of a timing circuit in a downhole well tool. The absence of motion which is indicative of the tool being at its operating position, permits an electronic counting circuit to initiate signals for operating the tool. The tool is prevented from being operated in a nearly horizontal or inverted position even in the absence of motion. The tool may be repetitively operated by alternately causing motion and the absence of motion of the tool. A photographic recording device makes a record of such repetitive operations.

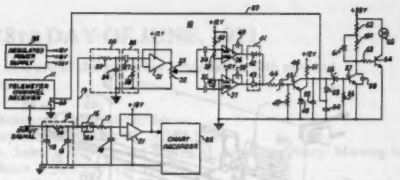
3,588,909

SPIKE SUPPRESSOR CIRCUIT FOR ANALOGUE RECORDER

Robert W. Beckwith, 1002 Greenfield Lane, Mount Prospect, Ill.

Filed June 23, 1969, Ser. No. 835,545
Int. Cl. G01d *5/12*
U.S. Cl. 346—33 **8 Claims**

A circuit is disclosed which detects noise bursts, effectively cancels the input signal during the duration of noise burst, and couples the input signal received just prior to a noise burst to the associated output circuitry until the noise burst



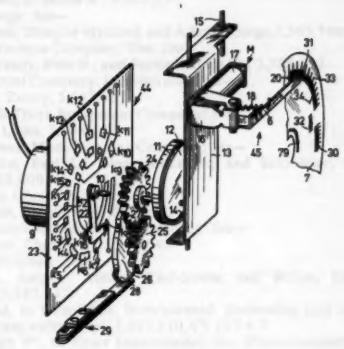
decreases below a threshold level to thus enable usable data to be obtained during such periods.

3,588,910

MACHINE OPERATION RECORDER

Oskar Zumkeller, Villingen, and Werner Roth, Buchenberg, Germany, assignors to Kienzle Apparate GmbH, Villingen, Germany

Filed Oct. 2, 1969, Ser. No. 863,079
Claims priority, application Germany, Oct. 8, 1968, P 18 01 691.6
Int. Cl. G07c *3/12*
U.S. Cl. 346—62 **20 Claims**



An arrangement for recording machinery operating characteristics in the form of operating times, production quantity, and bases for interrupting production and operation. Recordings are made through a movable pen on a record carrier which is rotated as a function of time. The pen is movable in a radial path with respect to the rotatable record carrier. Signal transmitters are coupled to the machine for the characteristics to be recorded. A pulse transmitter is used for transmitting a pulse for each unit produced, whereas a time interval transmitter is used for operating times and manual switches are provided for recording the bases of operating interruptions. A rotary switch has contact segments connected to the pulse transmitter, time interval transmitter and manual switches. Recordings are made in the form of radial lines and arc-shaped stripes on the record carrier for distinguishing between the machine characteristics to be recorded.

3,588,911

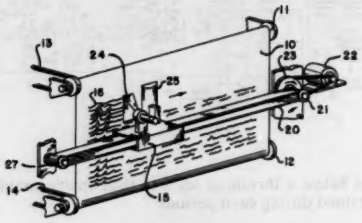
DISPLAY SYSTEM FOR SEISMIC DATA

Robert R. Luke, Houston; Marshall M. Robinson, Sugar Land, and Kenneth Thomson, Pasadena, Tex., assignors to Shell Oil Company, New York, N.Y.

Filed Jan. 24, 1968, Ser. No. 700,197
Int. Cl. G01d *15/06, 9/12*; G01v *1/24*

A display system for producing a visual record of electrically recorded seismic data using a photoconductive medium. The system uses a cathode-ray tube to convert the electrical

signals to visible light for writing the seismic data on the photoconductive medium. The system includes means for spatially limiting the electrostatic charging of the photoconductive medium prior to writing the signals on the photoconductive medium. The system also includes a means for developing the charge patterns in a liquid bath such that rapid access is attained, allowing online inspection of the processed data.



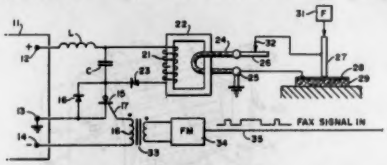
3,588,912

ELECTROJUNCTION PRINTING PULSE DRIVER CIRCUIT, assignor to Phonocopy, Inc., Wilmington, Del.

Filed June 5, 1969, Ser. No. 830,661

Int. Cl. G01d *15/10*

U.S. Cl. 346—76 **6 Claims**



A series resonant circuit is connected to a source of power and arranged to be triggered for oscillation through a portion of a complete cycle. A current transformer coupled across the capacitor of the resonant circuit has its high current secondary winding coupled to a low impedance load such as the electrojunction in an electrojunction printing system. Heat buildup in the load is compensated by controlling the time interval between successive oscillatory cycles in accordance with the total number of such cycles which are applied during a printing pulse.

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 28TH DAY OF JUNE, 1971

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

AB Inva: *See—*
Norlindh, Sven Erik Malte, 3,588,274.

Abashkin, Valentin Vasilievich; and Travin, Petr Ivanovich. Axle-box for axle of pair of wheels of track rolling stock. 3,588,204, Cl. 308-184.

Abraham, Edward D.: *See—*
Ellms, Robert W.; and Abraham, Edward D.,3,587,714.

Abramson, Paul; and Emerson, Lawrence W., to International Business Machines Corporation. Frequency detector circuit utilizing an electromechanical tuned filter. 3,588,719, Cl. 329-105.

ACF Industries Incorporated: *See—*
Atkinson, Eulas R.; and Powell, R Gordon, 3,587,869.
Dugge, Richard H.; Schipper, Dennis J.; and Smith, Garth R., 3,587,834.

Adams, Frederick John, to Cam Gears Limited. Fluid control valve with radially drilled parts. 3,587,646, Cl. 137-625.17

Adams, Gary A.: *See—*
Russell, Edward J.; Brown, Gaylord W.; Adams, Gary A.; and Dorman, Denis J.,3,587,816.

Addy, William D.; and Wessells, Forrest A., to Grace, W. R., & Co. Negative mounting plate. 3,588,079, Cl. 269-21.

Adkin, Glenn C. Fruit packaging apparatus. 3,587,674, Cl. 141-78.

Adkins, David E.; Legue, Ronald L.; and Widman, Michael V., to American Gas Association, Inc. Geodynamic wing. 3,587,756, Cl. 175-61.

Adrian, Philip R., to Fruit Harvesting Co., Inc. Crate-holder. 3,587,884, Cl. 214-83.24

Aeronautiques: *See—*
Miniovitch, Wladimir; and Chenin, Claude, 3,587,999.

Aerpat A.G.: *See—*
Rigot, Robert M., 3,587,271.

AGA Aktiebolag: *See—*
Johannisson, Dag Olof Alfred, 3,588,041.

Agarwala, B. Kumar, to Revell Incorporated. Slot-car game. 3,588,111, Cl. 273-119.

AGFA-Gevaert Aktiengesellschaft: *See—*
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Wasser, Willi; Browatzki, Kurt; Friedsam, Joseph; and Heidenreich, Max, 3,587,962.

AGSCD Chemicals Inc.: *See—*
Brown, Lawrence Russell, 3,587,938.

Ahrens, Harold R., to Cohen Electronics, Inc. Multileve solid state DC voltage standard. 3,588,673, Cl. 323-9.

Air Reduction Company, Incorporated: *See—*
Anderson, Emmett R.; and Rutz, Robert E., 3,588,465.
Daggett, Evans H., 3,588,466.
Purkhiser, Rawlins E., 3,588,660.

Aisin Seiki Kabushiki Kaisha: *See—*
Sugiura, Hiroshi; Tsuge, Sakae; Hosaka, Izumi; Kusunoki, Kunio; and Fujita, Saburo, 3,587,803.

Akamatsu, Hiroo; and Morita, Takanobu, to Omron Tateisi Electronics Co. Method and apparatus for photoelectric inspection of sheet materials. 3,588,513, Cl. 250-219.

Akamatsu, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. Multiphase DC chopper circuit. 3,588,664, Cl. 321-2.

Akeley, Lloyd T., to Simmonds Precision Products, Inc. Magnetic float reed switch point sensor. 3,588,404, Cl. 200-84.

Akselsen, Hans, to Honeywell Inc. Shell type motor rotating armature and method of manufacture. 3,588,560, Cl. 310-214.

Aktiebolaget Electrolux: *See—*
Anderson, Erik Arne, 3,587,515.
Asher, Ampan; Almen, Carl-Gosta; and Boren, Karl Gunnar, 3,587,242.
Autrand, Hubert Marc William, 3,587,514.

Aktiebolaget Karlstads Mekaniska Werkstad: *See—*
Lindahl, Carl-Axel; Ohlsen, Bengt Ludvig; and Hjort, Lars Ake Valdemar, 3,588,272.

Aktiengesellschaft Adolph Saurer: *See—*
Porter, Allan William Henry, 3,587,667.

Aktiengesellschaft Brown, Boveri & Cie: *See—*
Knapp, Peter, 3,588,542.

Akuta, Tomohiko; and Seya, Atsumi, to Yawata Iron & Steel Co., Ltd., and Mitsubishi Seiko Kabushiki Kaisha. Method and apparatus for measuring a relatively small load variation. 3,587,758, Cl. 177-1.

Alan, I. W. Frank, Corporation, The: *See—*
Czetli, Jess, 3,587,132.

Alcan Research and Development Limited: *See—*
Hyland, John E.; and Mc Laughlin, Frank C., 3,587,890.
Sivilotti, Olivo G., 3,587,265.

Alciati, Charles J., to Mil Engineering & Machinery Co. Control system for roller mills. 3,587,986, Cl. 241-231.

Alden Research Foundation: *See—*
Simpkins, Frederick W., 3,588,514.

Aldrich, John A., to United States of America, Navy. Moving target simulator. 3,588,237, Cl. 352-39.

Alexander, Earl Glynn; and Runyan, Walter Richard, to Texas Instruments, Incorporated. Insulated isolation techniques in integrated circuits. 3,587,166, Cl. 29-578.

Alexander, John Malcolm; Lengyel, Bela; and Ashford, Peter Guy, to National Research Development Corporation. Feedstock clamping means. 3,587,270, Cl. 72-60.

Alexander, John, to Technidyme, Inc. Optical alignment methods and means utilizing coordinated laser beams and laser beam coordinating means for same. 3,588,255, Cl. 356-153.

Alexandre, Philippe, to Societe Generale de Constructions Electriques et Mecaniques (Alsthom). Safety valves. 3,587,625, Cl. 137-398.

Alfa-Laval AB: *See—*
Baum, Engelbert, 3,587,932.

Alfiero, Joseph A. Connector for terminal strips. 3,588,786, Cl. 339-75.

Allanson, John T.: *See—*
Martindale, Allan; Allanson, John T.; and Parr, Bryan R.,3,587,240.

Allegheny Ludlum Steel Corporation: *See—*
Randich, Erasmus A., 3,587,266.
Randich, Erasmus A., 3,587,276.

Allen, George: *See—*
Venison, Douglas Michael; and Allen, George,3,587,746.

Alliance Machine Company, The: *See—*
Mc Cready, Ross B.; and Forster, Klaus W., 3,588,073.

Allied Control Company, Incorporated: *See—*
Olsen, Zenny, 3,587,617.

Allied Tank Truck Equipment Company: *See—*
Field, Louis, 3,588,137.

Allis Chalmers Manufacturing Company: *See—*
Koehlke, Earl L.; Lipe, Bruce R.; and Schroeder, Earle E., 3,588,009.

Allis, Louis, Company, The: *See—*
Purman, Joseph W., 3,588,203.

Allis-Chalmers Manufacturing Company: *See—*
Gilmore, Thomas P., 3,588,645.

Almen, Carl-Gosta: *See—*
Asher, Ampan; Almen, Carl-Gosta; and Boren, Karl Gunnar,3,587,242.

Alper, Fred, to Com-Tech, Incorporated. Embossing tool adjustable for different width strips. 3,587,810, Cl. 197-6.7

Alten, Ralph W., to Essex International, Inc. Electromagnetic relays. 3,588,765, Cl. 335-203.

AMBAC Industries, Incorporated: *See—*
Ashcraft, Joel N., 3,588,698.
Hussey, Russell B.; Kimberley, John A.; and Snyder, Warren E., 3,587,547.
Kebbon, Earl R.; and Ashcraft, Joel N., 3,587,549.
Kimberley, John A.; Hussey, Russell B.; Inoue, Takashi; Masuda, Takao; and Harada, Takeshi, 3,587,535.

Amerace Esna Corporation: *See—*
Flanagan, Robert M., 3,587,416.

American Air Filter Company, Inc.: *See—*
Huntington, Robert G., 3,588,068.

American Cyanamid Company: *See—*
Gilbert, Richard Lapham, Jr.; and Knapp, Paul William, 3,587,292.

American Gas Association, Inc.: *See—*
Adkins, David E.; Legue, Ronald L.; and Widman, Michael V., 3,587,756.

American Machine & Foundry Company: *See—*
Meisoll, Robert F.; and Moss, Edgar L., Jr., 3,587,379.

American Optical Corporation: *See—*
Siegmund, Walter P., 3,588,221.

American Rehabilitation Foundation, Inc.: *See—*
Madsen, Lorrin H., 3,587,569.

American Standard Inc.: *See—*
Wallick, Calude R., Jr., 3,588,080.

Amerock Corporation: *See—*
Newcomer, John I.; and Lambertz, Martin R., 3,588,020.

Ames, W. R., Company: *See—*
Kinkead, Alan, 3,587,763.

Ametek, Inc.: *See—*
Giltner, Charles M., 3,587,658.

AMF Incorporated: *See—*
Casson, Charles F., 3,588,605.
Harriau, Robert R.; and Rudd, Wallace C., 3,588,426.

Koch, Claude V., 3,588,394.
Oppenheimer, Edgar D.; and Roberts, Sidney, 3,588,427.

AMF-Incorporated: *See—*
Felcheck, Marvin, 3,588,838.

Ammerman, Robert L., to North American Rockwell Corporation. Variable-orifice device. 3,588,076, Cl. 267-127.

AMP Incorporated: *See—*
Demler, Henry William, Sr.; and Weist, Edward Landis, 3,588,149.
Kindell, Colin David; and Raynor, Terence Robert, 3,588,787.
Kindell, Colin David; and Raynor, Terence Robert, 3,588,792.
Kindell, Colin David; and Raynor, Terence Robert, 3,588,793.
Kunkle, John Philip; and Swengel, Robert Charles, Jr., 3,588,784.
Murray, Robert Maclay, 3,587,502.
Polidori, Mario, 3,588,791.

Ampex Corporation: *See—*
Barnett, Charles D., 3,588,197.
Hunt, Robert P.; Dickey, Baron C.; and Bousky, Samuel, 3,588,218.

Anaconda American Brass Company: *See—*
Bahr, William T.; and Bakstis, Joseph D., 3,587,643.

Andersen, Per Heymann: *See—*
Vabo, Bent Bors; and Andersen, Per Heymann,3,587,669.

Anderson, Arthur L.: *See—*
Cox, Ronald W.; and Anderson, Arthur L.,3,588,890.
Spencer, Arthur M.; Anderson, Arthur L.; and Dysart, Gordon R.,3,587,744.

Anderson Bros., Manufacturing Company: *See—*
Sorensen, Robert P., 3,587,829.

Anderson, Duane H.: *See—*
Rash, Ross D.; Anderson, Duane H.; Nelson, Hilding E.; and Byrns, Paul D.,3,588,837.

Anderson, Edward William, to Smiths Industries Limited. Multi-function selector with automatically changing annotations. 3,588,422, Cl. 200-167.

Anderson, Emmett R.; and Rutz, Robert E., to Air Reduction Company, Incorporated. Line voltage compensating pulsed power welding supply. 3,588,465, Cl. 219-137.

Anderson, Erik Arne, to Aktiebolaget Electrolux. Pressure differential indicating means. 3,587,515, Cl. 116-70.

Anderson, Ingvar G., to Metropolitan Waste Conversion Corporation. Rag separation equipment. 3,587,851, Cl. 209-74.

Anderson, Robert F.: *See—*
Shook, Carl G.; Anderson, Robert F.; and Macano, Samuel J.,3,588,825.

Anderson, Tage O.: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,588,883.

Andrascek, Ernst; and Rosshaupter, Erich, to Siemens Aktiengesellschaft. Microwave filter utilizing multiplate technique in which dielectric coatings are applied to metal plates. 3,588,757, Cl. 333-73.

Andrews, William J. Exercising apparatus. 3,587,319, Cl. 73-379.

Androsova, Valentina Georgievna: *See—*
Pozdnyakov, Petr Grigorievich; and Androsova, Valentina Georgievna,3,588,554.

Angevine, Peter A.; and Priestley, Robert J., to Dorr-Oliver, Incorporated. Process for compacting decrepitatable fines. 3,588,063, Cl. 263-53.

Anthony, Myron L., 10% to Dorn, Thomas E. Dead reckoning navigation position computers. 3,588,478, Cl. 235-150.27

Antoszewski, Eugeniusz, to English Electric Company Limited. Frequency discriminators. 3,588,711, Cl. 328-140.

Anufriev, Viktor Vasilievich; Vechkanov, Konstantin Mikhailovich; and Zemlyannikov, Konstantin Feoktistovich. Device for processing raw fats. 3,587,695, Cl. 146-192.

Aoshika, Masayuki: *See—*
Yasukawa, Shozo; and Aoshika, Masayuki,3,588,309.

Appareillage Thermoflex: *See—*
Callet, Joseph, 3,588,299.

Appel, Arthur; and Taschler, Edward J., to International Business Machines Corporation. Fabrication of complex electrodes by photoetching for electrical discharge machining apparatus. 3,588,430, Cl. 219-69.

Apri, Edward W. Momentum actuated harness. 3,588,173, Cl. 297-386.

Araki, Sigeru: *See—*
Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi,3,588,243.

ARC-Co Incorporated: *See—*
Pepe, William V., 3,587,906.

Arcadio, Espasa Fanes. Inertia switch. 3,588,400, Cl. 200-61.45

Arcos Corporation: *See—*
Johnson, Wallace C., 3,588,443.

Arene, Francois; and Deramond, Marcel. Telemetric telescope for direct firing arms. 3,588,250, Cl. 356-8.

Arentz, John C., to North American Rockwell Corporation. Case gluer and sealer. 3,587,209, Cl. 53-374.

Ariev, Grigory Evseevich: *See—*
Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich,3,587,673.

Arita, Kosei. Token destroying vending system. 3,587,806, Cl. 194-4.

Armistead, Fontaine C., to Texaco Inc. Method and apparatus for borehole directional logging. 3,587,175, Cl. 33-205.

Armistead, Fontaine C.; and Paull, Peter L., to Texaco Inc. Method and apparatus for positioning a maneuverable naval structure over a fixed position. 3,588,796, Cl. 340-6.

Armstrong Cork Company: *See—*
Kurtz, Arthur E., 3,587,881.
Roy, Gerald L., 3,587,855.

Armstrong, Melvin S.: *See—*
Congleton, David B.; Glazer, Sydney; and Armstrong, Melvin S.,3,588,818.

Armstrong, William H.: *See—*
Beagles, John A.; and Armstrong, William H.,3,587,779.

Arnold & Richter KG: *See—*
Gerb, Joachim, 3,587,960.

Arnold, Gunther, to General Motors Corporation. Universal joint. 3,587,249, Cl. 64-7.

Arnoldy, Roman F., to R. I. Patents, Inc. Strip bulkwelding. 3,588,432, Cl. 219-73.

Arrow-Hart Inc.: *See—*
Milcoy, Edgar A. P., 3,588,411.

Artisan Industries Inc.: *See—*
Monty, Leo J., 3,587,704.

Asano, Shintaro; and Baxter, Larry K., to Shintron Company, Inc. X-ray display means. 3,588,240, Cl. 353-85.

Asano, Souji: *See—*
Tokumitsu, Ichiro; Okamura, Mitsumaro; and Asano, Souji,3,587,727.

Ashcraft, Joel N.: *See—*
Kebbon, Earl R.; and Ashcraft, Joel N.,3,587,549.

Ashcraft, Joel N., to AMBAC Industries, Incorporated. Electronic tachometer. 3,588,698, Cl. 324-169.

Asher, Ampan; Almen, Carl-Gosta; and Boren, Karl Gunnar, to Aktiebolaget Electrolux. Absorption refrigerator. 3,587,242, Cl. 62-77.

Ashford, Peter Guy: *See—*
Alexander, John Malcolm; Lengyel, Bela; and Ashford, Peter Guy,3,587,270.

Ashton, Wesley W. Toy having flexible track. 3,587,190, Cl. 46-43.

Aspden, Ronald, to Itek Corporation. Optical surface generating method. 3,587,195, Cl. 51-284.

Associated Electrical Industries Industries Limited: *See—*
Halliday, John Stephen; Merren, Thomas Oliver; and Heath, John Stewart, 3,588,495.

Association des Durriers en Instruments de Precision: *See—*
Schnerb, Pierre, 3,587,176.

Ast, Adolf, to Sauter, August, KG. Weighing balances. 3,587,762, Cl. 177-203.

Astrand, Carl Vicktor. Method and apparatus for making granules. 3,587,373, Cl. 83-43.

Atanabe, Masahiro: *See—*
Sakai, Yasuhide; Takagi, Yoshinori; and Atanabe, Masahiro,3,588,706.

Ateliers de Constructions Electriques de Charleroi (ACEC) Societe Anonyme: *See—*
Jauquet, Christian, 3,588,372.

Ateliers de Constructions Electriques de Charleroi (ACEC): *See—*
Mertens, Pierre, 3,588,494.

Ateliers des Charmilles S.A.: *See—*
Bonga, Benno Ibo; Lehmann, Hans Rudolf; and Vuichard, Michel Antoine Emile, 3,588,196.

Ateliers Diederichs: *See—*
Remond, Pierre, 3,587,662.

Athey, Stuart E., to Hobart Manufacturing Company, The. Electronic testing apparatus. 3,588,680, Cl. 324-28.

Atkin, Rupert L.; and Drutchas, Gilbert H., to TRW Inc. Four wheel skid control system. 3,588,191, Cl. 303-21.

Atkinson, Eulas R.; and Powell, R Gordon, to ACF Industries Incorporated. End-of-car cushioning mechanism. 3,587,869, Cl. 213-8.

Atlantic Richfield Company: *See—*
Bemrose, John; and Kilmer, Lauren G., 3,587,774.
Demuth, Thomas P., 3,588,858.
Moore, Edward J.; and Desai, Kantilal P., 3,588,800.
Whiting, Jerry M., 3,588,175.

Atomic Energy of Canada Limited: *See—*
Pegrum, James W., 3,588,499.
Wilson, Ivan L., 3,587,623.

August Bilstein Ennepetal: *See—*
Keilholz, Friedrich; Hausmann, Erwin; and Jentsch, Erwin, 3,587,789.

August, Paul. Mixer for cement or the like. 3,588,056, Cl. 259-178.

Autelca AG: *See—*
Meloni, Mario, 3,587,809.

Autolift Garage AB: *See—*
Strandberg, Lennart; and Strandberg, Maj, 3,587,878.

Automatic Development Corporation: *See—*
White, Frank F., 3,587,822.

Automatic Radio Mfg., Co., Inc.: *See—*
Pierrat, Michael A., 3,587,237.

'Automatic' Sprinkler Corporation of America: *See—*
Sievenpiper, Ward, 3,588,134.

Automobiles Peugeot: *See—*
Mercier, Jacques, 3,587,439.
Moulin, Jean, 3,588,287.
Rouvre, Philippe A. R.; Pineau, Jean E. X.; Peroy, Francois; and Delay-action motor energizing control devices, 3,588,657.

Autrand, Hubert Marc William, to Aktiebolaget Electrolux. Device for signaling need for cleaning or replacing suction cleaner dust bag. 3,587,514, Cl. 116-67.

Avco Corporation: *See—*
Eckart, John W., 3,587,304.
Langan, Marion J., 3,588,530.

Avery, Carl F., Jr.; Pearson, Ernest A.; and Winters, Lloyd V., to Medical Supply Company. Mechanisms for feeding and dropping elongated tubular bodies and caps. 3,587,920, Cl. 221-176.

Avesta Jernoerks Aktiebolag: *See—*
Spara, Otto Alvar, 3,587,256.

Avignon, Michel L.; and Mader, Joseph L., to International Standard Electric Corporation. Centering arrangement for a ternary coder. 3,588,878, Cl. 340-347.

Aylward, William G.; and Du Pont, William W., to Keuffel & Esser Company. Packaging aid apparatus and method. 3,587,202, Cl. 53-39.

Ayres, James N.: *See—*
Gratton, Peter D.; and Ayres, James N.,3,587,469.

Babcock & Wilcox Company, The: *See—*
Porath, Gordon H.; and Martin, Anthony J., 3,587,370.

Bache, Rene C.: *See—*
Clark, John H.; and Bache, Rene C.,3,588,330.

Bachmann, John H., Jr.: *See—*
Ward, Henry D., Jr.; Ward, William F.; and Bachmann, John H., Jr.,3,588,095.

Bade, Walter H., to Sandusky Foundry & Machine Company. Apparatus for centrifugally casting an article with an internal flange. 3,587,720, Cl. 164-302.

Badger, David H., to Ransbury Electro-Coating Corporation. Spray coating apparatus. 3,587,967, Cl. 239-15.

Badger Meter Manufacturing Company: *See—*
Kullmann, Donald J., 3,587,314.

Badger Northland Inc.: *See—*
Schoen, Gerald L., 3,587,827.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Unterstenhoefer, Leo; and Krieger, Wilhelm, 3,587,981.

Baermann, Max. Arrangement, preferably for operating contacts for switching or control devices and the like. 3,588,766, Cl. 335-207.

Baermann, Max. Adjustable magnetic braking system. 3,588,768, Cl. 335-225.

Bahr, William T.; and Bakstis, Joseph D., to Anaconda American Brass Company. Apparatus for transfer of liquids. 3,587,643, Cl. 137-615.

Baier, William E., Jr., to Shell Oil Company. Hydrogen-oxygen sound source. 3,587,775, Cl. 181-0.5

Bailey, Cecil; and Frederick, Oscar C., to General Electric Company. Arc chute having arc runners coated with thermally- sprayed refractory metal. 3,588,405, Cl. 200-144.

Bailey, Cecil; and Frederick, Oscar C., to General Electric Company. Arcing contact structure and method of making same. 3,588,433, Cl. 219-76.

Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin, to Holden Industries, Inc. Method of making magazine insert. 3,588,085, Cl. 270-37.

Bailey, Ronald G., to Honeywell Inc. Fluidic sensor. 3,587,603, Cl. 137-81.5

Bailey, Stephen P.: *See—*
Miller, Robert P.; Miller, Marvin; and Bailey, Stephen P.,3,588,581.

Baird-Atomic, Inc.: *See—*
Habosian, Kaspar, 3,588,252.

Baker Oil Tools, Inc.: *See—*
Chenoweth, David V., 3,588,282.

Bakstis, Joseph D.: *See—*
Bahr, William T.; and Bakstis, Joseph D.,3,587,643.

Balas Collet Company: *See—*
Cox, John R.; and Mix, Joseph E., 3,587,124.

Balazs, Miklos, to International Computers Limited. Speed indicating apparatus for electric motors. 3,588,654, Cl. 318-331.

Balch, James L.: *See—*
Brassington, Earl; Balch, James L.; and Hornagold, Harry V.,3,587,691.

Balder, Jan Jacob; Rijinders, Johannes; and Van Leeuwen, Johannes Aloysius, to U.S. Philips Corporation. Exposure device for manufacturing picture screens for cathoderay tubes intended for the display of colour scenes. 3,587,417, Cl. 95-1.

Baldridge, William Griff, to Druid Plastics, Inc., mesne. Plastic pipe making apparatus. 3,587,137, Cl. 18-26.

Baldwin-Lima-Hamilton Corporation: *See—*
Brownell, Roy D.; and Rogers, Richard E., 3,587,682.

Ball, Albert Herbert, to Lucas, Joseph, (Industries) Limited. Igition distributor casing and sealing means therefor. 3,588,421, Cl. 200-168.

Ball, Henry; and Wagner, Theodor M., to RCA Corporation. Colored light transmission compensating encoding filter. 3,588,325, Cl. 178-5.4

Balland, Jean Claude: *See—*
Hennart, Claude; Martin, Georges; and Balland, Jean Claude,3,587,968.

Ballou, Richard P., to General Motors Corporation. Fuel pump safety circuitry. 3,587,545, Cl. 123-136.

Bammert, Wilhelm; and Kaiser, Hans-Peter, to Schloemann Aktiengesellschaft. Mould-closing device. 3,587,138, Cl. 18-30.

Banathy, Eugene D.; Rosenski, Julius R.; and Sechrist, Claude Jerome, to International Register Company, mesne. Plug-in twenty-four hour time switch. 3,588,391, Cl. 200-6.

Bancroft, Joseph, & Sons Co.: *See—*
McKinney, Donald W.; and Sinski, Henry A., 3,587,145.

Bandy, William J., Jr.; and Sell, Robert L., to Rohrer, Karl R., Associates. Sampling device. 3,587,324, Cl. 73-423.

Bangerter, Kenneth R.; and Law, John P., to Ingersoll-Rand Company. Automatic screwdriver. 3,587,683, Cl. 144-32.

Barbas, Joseph, Jr.; Paulauskas, Justin V.; and Peterson, William C., to Weston Instruments Division. Instrument with indicating and relay modes of operation comprising an electrical conductor carried by a flexible film. 3,588,515, Cl. 250-231.

Barber, C. Richard: *See—*
Lunt, Judith Lee, 3,588,169.

Barber-Greene Company: *See—*
Smith, Fred T., 3,587,825.

Barbin, Robert Lloyd, to RCA Corporation. Electromagnetic deflection yoke having bypassed winding turns. 3,588,566, Cl. 313-76.

Barkan, Philip; and Kotos, Peter, to General Electric Company. High voltage electric circuit breaker with high speed stripping means. 3,588,520, Cl. 307-112.

Barker, William M., to General Signal Corporation. Spare channel system for sectionalizing a communication line circuit. 3,588,824, Cl. 340-163.

Barnard, Mark Cary Sedgwick, to Leyland Gas Turbines Limited. Rotary fuel pump. 3,588,289, Cl. 417-294.

Barnes, Edward D., to Datacap Systems. Edge-punched data card sorter. 3,587,853, Cl. 209-80.5

Barnett, Charles D., to Ampex Corporation. Fluid lubricated bearing. 3,588,197, Cl. 308-9.

Barney, Howard H.: *See—*
Mark, John W.; and Barney, Howard H.,3,587,613.

Barron, Roger D.: *See—*
Stone, Eugene E., III; Lynch, Walter L., Jr.; and Barron, Roger D.,3,588,091.

Barry, Robert John: *See—*
Herlan, Alton G., 3,588,302.

Barsumian, Robert. Non-kink transition tube. 3,588,148, Cl. 285-8.

Bartel, Karl; and Ross, Austin, to Printing Developments, Inc. Knockout masking techniques. 3,588,322, Cl. 178-5.2

Bartlett, Richard F.; and Case, Laura K., to Itek Corporation. Multiple copy photographic system. 3,587,465, Cl. 101-457.

Bartlett, William F.; Randmere, Uno; and Scott, Richard, to Stromberg-Carlson Corporation. Interlaced dynamic data buffer. 3,588,833, Cl. 340-172.5

Basart, Jose Bassa. Shuttleless looms. 3,587,666, Cl. 139-123.

Basiulis, Algerd, to Hughes Aircraft Company. Heat pipe having a substantially unidirectional thermal path. 3,587,725, Cl. 165-32.

Baskwell, John A., to Pirelli General Cable Works Limited. Sheathing of electric cables. 3,587,522, Cl. 118-50.

Bassett, David R.: *See—*
Zettlemoyer, Albert C.; and Bassett, David R.,3,587,966.

Batteau, Blanca D.: *See—*
Moshier, Stephen; and Batteau, Dwight W.,3,588,356.

Batteau, Dwight W.: *See—*
Moshier, Stephen; and Batteau, Dwight W.,3,588,356.

Bauer, Douglas M.; and Nagel, Martin J., to General Electric Company. Failure warning system. 3,588,856, Cl. 340-181.

Baum, Engelbert, to Alfa-Laval AB. Transport container for liquid dung. 3,587,932, Cl. 222-178.

Baun, Leonard J., to RCA Corporation. Television blanking and synchronizing signal generator. 3,588,351, Cl. 178-69.5

Bausch & Lomb Incorporated: *See—*
Kreckel, Kurt H.; and Mannik, Kallis H., 3,588,462.

Baxter, Laboratories: *See—*
Hultberg, Wayne Marshall, 3,587,840.

Baxter Laboratories, Inc.: *See—*
Hagan, William K.; and Burdick, Thomas H., 3,587,564.

Baxter, Larry K.: *See—*
Asano, Shintaro; and Baxter, Larry K.,3,588,240.

Bayha, Jack E. Plastic record turntable spindle. 3,588,120, Cl. 274-10.

Bayne, William Elbert, to Clark Manufacturing Company. Implement for applying fertilizer. 3,588,139, Cl. 280-43.22

Beach, John Myers; Oglesbee, Edgar Crain; White, Arthur Roger; Ziegler, George Stephen; and Cecil, Harry Hamilton, said Beach, mesne. Automatically operable brake apparatus for trailer vehicles. 3,587,788, Cl. 188-71.7

Beagles, John A.; and Armstrong, William H., to United States of America, Navy. Diving helmet, input air noise silencer. 3,587,779, Cl. 181-36.

Beauchamp, George D.; and Ware, James M., to Texas-U.S. Chemical Company. Test apparatus for process computer interface instrumentation. 3,587,290, Cl. 73-1.

Beausoleil, William F.; and Uberbacher, Edward C., to International Business Machines Corporation. Pulse switching apparatus. 3,588,408, Cl. 200-152.

Beazley, Aubrey G., to Farah Manufacturing Company, Inc. Thread breakage detector. 3,587,497, Cl. 112-218.

Becchi, Raffaele, to Olivetti, C., Ing., & C., S.p.A. Reader for a punched paper tape or other punched support. 3,588,453, Cl. 235-61.11

Becco, Inc.: *See—*
Smith, Jerry R.; and Laner, Sigmond Harvey, 3,587,837.

Beckwith, Robert W. Spike suppressor circuit for analogue recorder. 3,588,909, Cl. 346-33.

Becton, Dickinson and Company: *See—*
Giangarra, Anthony; and Cybulsky, Kenneth J., 3,587,921.
Haiken, Robert M., 3,587,776.
Williams, Andrew S., 3,587,562.

Beede Electrical Instrument Co., Inc.: *See—*
Friedman, Joel S., 3,588,516.

Beermaster Industries Ltd.: *See—*
Stott, Reginald W., 3,587,927.

Beese, Norman C., to Westinghouse Electric Corporation. Short-arc electric discharge lamp having an arc- ignitor assembly that is movably mounted within an integral part of the lamp envelope. 3,588,572, Cl. 313-146.

Belady, Laszlo A.; Kuehner, Carl J.; Lehman, Meir M.; and Randell, Brian, to International Business Machines Corporation. Hierarchical memory updating system. 3,588,839, Cl. 340-172.5

Belden, Robert Wayne: *See—*
Huston, James Anthony; Belden, Robert Wayne; and May, Kenneth Devere,3,588,090.

Bell & Howell Company: *See—*
Elazar, Shmuel, 3,588,728.
Huston, James Anthony; Belden, Robert Wayne; and May, Kenneth Devere, 3,588,090.
Levin, Herman, 3,588,558.

Bell & Howell Company, The: *See—*
Bell, Norton William, 3,588,086.

Bell, John J. Operation control device. 3,587,332, Cl. 74-54.

Bell, Norton William, to Bell & Howell Company, The. Insertion machine having feedback light control system. 3,588,086, Cl. 270-58.

Bell Telephone Laboratories, Incorporated: *See—*
Copeland, John A., III; and Spiwak, Robert R., 3,588,742.
Dunn, Frank A., 3,587,196.
Glance, Bernard, 3,588,741.
Herriott, Donald R.; and Rawson, Eric G., 3,588,245.
Litofsky, Barry, 3,588,879.
Lynes, Dennis J.; Shichman, Harold; and Waaben, Sigurd G., 3,588,849.
Olsen, Karl M.; and Stoffers, Raymond C., 3,588,764.
Seidel, Harold, 3,588,727.
Smith, Richard A., 3,588,460.
Theuerer, Henry C.; and Turner, Paul A., 3,588,853.
Thomson, David J., 3,587,615.
Tong, Shih Y., 3,588,819.

Bell, William E., to United States of America, Army, mesne. Pulsed gas ion laser. 3,588,740, Cl. 331-94.5

Beller, Hans: *See—*
Klein, Hans Christof; Beller, Hans; and Schrader, Gert,3,588,810.

Belozerov, Anatoly Vasilievich: *See—*
Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich,3,587,673.

Belugou, Pierre; and De Chaumont, Jean, to Charbonnages De France. Method and apparatus for measurement by determining the temperature of a thermosensitive element heated by the Joule effect. 3,587,318, Cl. 73-362.

Bemrose, John, deceased (by Bemrose, Elsie Hildegard, administratrix); and Kilmer, Lauren G., said Kilmer assor to Atlantic Richfield Company. Seismic shear wave impulse generator. 3,587,774, Cl. 181-0.5

Bender, Charles E.; Thompson, Taylor N.; and Fraser, Douglas. Freeze drying container. 3,587,899, Cl. 215-73.

Bender, Donald E.: *See—*
Russell, Lowell L.; and Bender, Donald E.,3,587,782.

Bendix Corporation, The: *See—*
Dawes, Leslie J., 3,587,398.
Dunkow, John T., 3,587,159.
Gessner, Gunter J.; and Vargo, Donald P., 3,588,857.
Haase, Elmer A.; and Kirwin, James M., 3,587,408.
Howland, George R., 3,587,606.
Mitchell, James I., 3,588,001.
Naumann, Erwin A., 3,588,007.
Peczkowski, Joseph L., 3,587,229.
Remus, Casimer F., 3,587,652.
Sulich, Janusz S., 3,587,543.
Sutton, Robert W., 3,587,553.
Van Der Sluys, Peter C.; Ellis, George E.; Levine, Louis; and Modrow, Fred P., 3,588,658.
Vick, Ralph L., 3,587,393.
Voight, Robert W.; and Moore, Robert G., Jr., 3,588,154.
Yareck, Michael J., 3,588,713.

Benjaminson, Morris A.; Satriano, Nicholas M.; and Katz, Irwin J. Wind directional air sampling device. 3,587,323, Cl. 73-421.5

Benke, Frank W.; and Uitto, Gary E., to Westinghouse Electric Corporation. Methods fo transposing sheet materials. 3,587,169, Cl. 29-624.

Bennett, Marvin D., to Royal Industries, Inc. Pump. 3,587,236, Cl. 60-52.

Benthos, Inc.: *See—*
Humphrey, Gerald R., 3,587,122.

Bentzman, Louis, to Electrocopy Corporation. Resilient book copier clamp. 3,588,024, Cl. 248-451.

Bereday, Sigmund. Pedestal construction. 3,588,015, Cl. 248-188.1

Berge, William E. Disposable diaper products and method of manufacturing. 3,587,409, Cl. 93-1.

Bergische Stahl-Industrie: *See—*
Seibel, Arthur, 3,587,992.

Berkey Photo, Inc.: *See—*
Michalski, Maksymilian A., 3,588,599.

Berlier, Richard A.; and Rice, Russell W., to International Business Machines Corporation. Drum structure for a xerographic copying machine. 3,588,242, Cl. 355-16.

Berlinghof, Theo, to Patent-Treuland-Gesellschaft fur Elektrische Gluhlampen mbH. Method of introducing halogens into electric lamps. 3,588,602, Cl. 316-7.

Bernatt, Joseph, to S & C Electric Company. High voltage beaver tail type switch with pre- insertion resistor. 3,588,406, Cl. 200-144.

Berne, Daniel R. Combination clock and switch. 3,588,415, Cl. 200-168.

Bernier, Louis E.; and Giblin, James P., to Wright, E. T., & Co., Inc. Shoes with cleated bottoms. 3,587,181, Cl. 36-59.

Berry, Daniel Victor, to Ingersoll Locks Limited. Plugs for key operated lock mechanisms. 3,587,261, Cl. 70-422.

Berry, Jean-Luc; and Dardaine, Edgar J., to Remy, E. P., & Cie. Device for gripping and uncapping bottles and automatic handling machines provided with such devices. 3,587,208, Cl. 53-381.

Berry, Morris J.; and Wells, Louis, to Fashioncraft-Excello. Expandable tote bag. 3,587,795, Cl. 190-44.

Berry, William R., to Westinghouse Electric Corporation. System and method for providing steam turbine operation with improved dynamics. 3,588,265, Cl. 415-1.

Berryman, Charles O., to Eaton Yale & Towne, Inc. Inverted pendulum oscillating controller impact switch with decreasing returning forces acting upon the pendulum as it pivots from its normal position. 3,588,401, Cl. 200-61.48

Berthold, Gottfried, to Bosch, Robert, G.m.b.H. Vaporizing and fluid flow means. 3,587,620, Cl. 137-154.

Bertin & Cie: *See—*
Bertin, Jean Henri; and Guienne, Paul Francois, 3,587,773.

Bertin, Jean Henri; and Guienne, Paul Francois, to Bertin & Cie. Facilities for confining the fluid cushions of a ground-effect machine. 3,587,773, Cl. 180-124.

Bertolini, Gianni; and Vinsani, Mario, to Olivetti General Electric S.p.A. Power converter with regulated output. 3,588,666, Cl. 321-2.

Best, Stanley G., to United Aircraft Corporation. Method and apparatus for tracking a seam. 3,588,463, Cl. 219-121.

Bethlehem Steel Corporation: *See—*
Wald, Herbert, 3,588,163.

Bettcher Industries, Inc.: *See—*
Bettcher, Louis A., 3,587,689.

Bettcher, Louis A., to Bettcher Industries, Inc. Comestible slicing apparatus. 3,587,689, Cl. 146-105.

Bevis, Jeffrey M., to Chalco Engineering Corporation. Variable frequency motor drive. 3,588,650, Cl. 318-227.

Bibelow-Garvey Lumber Co.: *See—*
Flodin, Carl T., 3,587,902.

Biber, Conrad H., to Polaroid Corporation. Power supply for a photographic camera. 3,587,425, Cl. 95-11.

Bigelow-Garvey Lumber Co.: *See—*
Flodin, Carl T., 3,587,901.

Bijleveld, Willem Jan; and van der Toorn, Adrianus Johannes. Bearer with logically coded digits. 3,588,457, Cl. 235-61.12

Bio-Engineering, Inc.: *See—*
Murr, William C., 3,587,588.

Bishop, James L., Jr. Straight edge fixture for woodworking. 3,587,680, Cl. 143-157.

Bishop, Vernon: *See—*
Edwards, Joseph Arthur, Jr.; Bishop, Vernon; Geci, Melan; and Campbell, Dudley H.,3,588,778.

Bissell Inc.: *See—*
Rosendall, Henry J., 3,587,127.

Bissett, Ernest E. Method and means of destination sorting of rail passengers. 3,587,472, Cl. 104-27.

Bjor, Hakon Einar, to Sentralinstitutt for Industriell Forskning. Analog network based on sampling for universal applications filter. 3,588,531, Cl. 307-229.

Black and Decker Manufacturing Company, The: *See—*
Smith, Stanley K., 3,587,752.

Black, Walter L.; and Holford, Frank L., to United States of America, Army, mesne. Automatic guy wire tensioning device. 3,588,050, Cl. 254-173.

Blaha, John F.: *See—*
Kolb, Edwin R.; Blaha, John F.; and Roberts, Webster C.,3,588,870.

Blair, Weston L. Animal feeder. 3,587,530, Cl. 119-51.11

Blake, Alan Francis: *See—*
Spencer, Alexander; Blake, Alan Francis; and Burns, David Guthrie,3,587,459.

Blazek, Donald F.; Bury, Elmer J.; Moore, Robert W.; and Smith, Oliver J., to United States of America, Navy, mesne. Device for recording data on film. 3,587,419, Cl. 95-1.1

Blickenderfer, Charles, Jr.; Erickson, Harold E.; and Clapp, Charles C., to Weyerhaeuser Company. Applicator. 3,587,153, Cl. 29-132.

Bliss, Billy R., to United States of America, Navy. Photoflash cartridge having dual flashes. 3,587,468, Cl. 102-32.

Block, Charles; and Mintz, Leon J., to Undergarment Assemblies, Inc. Apparatus for making a buckle and strap assembly. 3,587,947, Cl. 223-49.

Block, Harold C.: *See—*
Gerwick, Fred W.; and Block, Harold C.,3,587,740.

Block, Margaret D.: *See—*
Gerwick, Fred W.; and Block, Harold C.,3,587,740.

Bloom, Joseph Lewis, to Lucas, Joseph, (Industries)Limited. Liquid fuel control apparatus for gas turbine engines. 3,588,035, Cl. 251-61.

Bloom, Stanley Morton, to Polaroid Corporation. Plastic optical elements. 3,588,216, Cl. 350-1.

Blossom, James H., to Seismograph Service Corporation. Power control circuit for remote data recorder system. 3,588,522, Cl. 307-125.

Boelcs, Albin, to Escher Wyss Limited. Diffuser for a centrifugal fluid-flow turbomachine. 3,588,270, Cl. 415-162.

Bognar, Frank J.; and Gavagan, Robert J., to United States of America, Army, mesne. Adjustoclamp. 3,588,156, Cl. 292-113.

Boguslavsky, Nison Moshkovich. Apparatus for thermal treatment of free-flowing materials and slurry. 3,588,061, Cl. 263-32.

Bohlin, Karl Gunnar; Gustafsson, Carl-Erik; Johnsson, Stig Arthur; and Strombeck, Per Albin, to Svenska Cellulosa Aktiebolaget. Method and apparatus for handling a load. 3,587,889, Cl. 214-152.

Bohm, John, to Northern Electric Company Limited. Adjustable relay. 3,588,540, Cl. 307-251.

Bolam, Robert J.: *See—*
Halley, Robert; Bolam, Robert J.; and Marshall, Carroll W.,3,588,693.

Boland, Lawrence J.; and Granito, Gerry D., to International Business Machines Corporation. Integrated memory system with block transfer to a buffer store. 3,588,829, Cl. 340-172.5

Bolmgren, Jan R.: *See—*
Jacobson, Nils B.; and Bolmgren, Jan R.,3,588,235.

Bolt Associates, Inc.: *See—*
Chelminski, Stephen V.; and Delano, Anthony J., 3,588,039.

Bolton, Hugh Robert: *See—*
Laithwaite, Eric Roberts; and Bolton, Hugh Robert,3,588,555.

Bondon, David L.: *See—*
Bondon, Lewis A.; and Bondon, David L.,3,588,760.

Bondon, Lewis A.; and Bondon, David L. Semi-rigid elliptical waveguide. 3,588,760, Cl. 333-95.

Bonga, Benno Ibo; Lehmann, Hans Rudolf; and Vuichard, Michel Antoine Emile, to Ateliers des Charmilles S.A. Electrode linear feed and guiding mechanism for electro-erosion machining apparatus. 3,588,196, Cl. 308-5.

Boothe, Willis A., to General Electric Company. Method and apparatus for Reynolds Number compensation of working fluid supplied to fluid amplifier. 3,587,616, Cl. 137-81.5

Boren, Karl Gunnar: *See—*
Asher, Ampan; Almen, Carl-Gosta; and Boren, Karl Gunnar,3,587,242.

Borg-Warner Corporation: *See—*
Spokas, Romas B.; and Smith, Grant H., 3,587,537.

Borg-Warner Limited: *See—*
Hanzi, Carl W.; and Laing, James M., 3,587,347.

Borner, Gerhard: *See—*
Hochstein, Roland; Borner, Gerhard; and Taesler, Rudolf,3,588,239.

Bornstein, Rene; and Dubus, Gerard, to Service d'Exploitation Industrielle des Tabacs et des Allumettes. Method of transferring objects between moving conveyors. 3,587,817, Cl. 198-20.

Bosch, Robert, G.m.b.H.: *See—*
Berthold, Gottfried, 3,587,620.
Fussner, Paul; Hirsch, Gunter; and Vogt, Dieter, 3,587,977.
Grozinger, Alfred; and Wohr, Rolf, 3,588,617.
Hofmann, Eberhard; Muller, Rolf; and Staudt, Heinrich, 3,587,540.

Bost, Jonathan, to OPTO/Graphics, Inc. Paper separator. 3,588,094, Cl. 271-36.

Boudouris, Angelo, to Eprad Incorporated. Latching device for food trays. 3,587,866, Cl. 211-133.

Boughton, Gordon Rex, to Thorn Automation Limited. D. C. amplifiers. 3,588,724, Cl. 330-10.

Boulton, Richard C.: *See—*
Rosati, James J.; and Boulton, Richard C.,3,587,821.

Bous, Karl: *See—*
Rosenkranz, Dieter; and Bous, Karl,3,587,974.

Bousky, Samuel: *See—*
Hunt, Robert P.; Dickey, Baron C.; and Bousky, Samuel,3,588,218.

Bowden, George F., to Symons Mfg. Company. Flexible concrete column form panel. 3,588,027, Cl. 249-48.

Bowers, Glenn E.; and Edwards, Richard E., Jr., to United States Steel Corporation. Apparatus for measuring the softening point of a solid. 3,587,293, Cl. 73-17.

Bowles Fluidics Corporation: *See—*
Bowles, Romald E., 3,587,764.
Di Camillo, Carmine V., 3,587,609.
Moore, Larry R.; and Turek, Robert F., 3,587,604.

Bowles, Romald E., to Bowles Fluidics Corporation. Fludic adaptive spark advance system. 3,587,764, Cl. 180-64.

Bowling, John C., to General Dynamics Corporation. System for generating FSK tones for data transmission. 3,588,348, Cl. 178-66.

Bowmar Instrument Corporation: *See—*
Harden, Phillip L., 3,588,888.

Bowser, Inc.: *See—*
Romanowski, Albert F.; May, Larry A.; and Hays, Norman W., 3,587,808.

Boyd, Harry S. Die for cutting paper. 3,587,382, Cl. 83-651.

Braga, Albert T.; and Ruspino, James G., to Whirlpool Corporation. Air vent for an appliance. 3,588,213, Cl. 312-214.

Brailsford, Harrison D. Sampler and pumping system. 3,587,670, Cl. 141-35.

Brandstadter, Isaac Joseph, to Yissum Research Development Company. Starter for fluorescent lamps. 3,588,592, Cl. 315-99.

Brassington, Earl; Balch, James L.; and Hornagold, Harry V., to Mayer, Oscar, & Co., Inc. Machine for skinning bacon bellies. 3,587,691, Cl. 146-130.

Brearley, Lawrence E.; Jensen, Stanley M.; Subik, Vincent P.; and Williams, Gordon L., to International Business Machines Corporation. Pluggable module connector system. 3,588,615, Cl. 317-101.

Breiling, Hans George, to Dragerwerk Heinr. & Bernh Drager. Narcosis apparatus. 3,588,057, Cl. 261-39.

Breitfuss, Thomas K.; Wallace, Floyd L.; and Zicaro, Joseph P., to Hydro Conduit Corporation. Wrapped tubular concrete pipe. 3,587,659, Cl. 138-172.

Bremshey, Fritz; and Seitel, Heinz, to Telesco Brophey Limited. Cases for telescopic umbrellas. 3,587,600, Cl. 135-33.

Brennan, Francis P. Edge rolling mechanism. 3,587,275, Cl. 72-199.

Brenneman, George B.; and Coppin, William P., Jr., to Maxon Premix Burner Company, Inc. Radiant heat generating burner. 3,588,301, Cl. 431-348.

Brewer, Donald R.: *See—*
Nielsen, Asger T.; and Brewer, Donald R.,3,587,418.

Breymann, Gunther, to Justin Huppe. Suspension band of a venetian blind or the like. 3,587,707, Cl. 160-178.

Bricmont, Francis H.; and Pritchett, Ervin R. Workpiece temperature equalization in rolling of steel. 3,587,268, Cl. 72-13.

Bridges, Richard J.: *See—*
Stewart, Warren A.; and Bridges, Richard J.,3,587,374.

Bright, Edward D.: *See—*
Unger, Peter I.; and Bright, Edward D.,3,588,480.

Bright, Kenneth G., to Henkels and McCoy, Inc. Variable relief means for a hydraulic drive. 3,587,629, Cl. 137-484.2

Brill, Harold C., to Du Pont de Nemours, E. I., and Company. Coatings sensitive to ultraviolet light and photo- graphic method for using said coatings. 3,588,503, Cl. 250-65.

Brink, Robert E., to Shell Oil Company. Digital differential circuit means. 3,588,537, Cl. 307-235.

British Hovercraft Corporation Limited: *See—*
Povoas, Lawrence Brian, 3,587,296.

British Iron and Steel Research Association, The: *See—*
Townsend, Nicholas A.; and Oxlade, Roy R., 3,587,267.

British Railways Board: *See—*
Dobbs, David John Miller; and Linder, Derek, 3,588,441.

Brizzi, Giovanni. Lamellar electrical connector terminal. 3,588,862, Cl. 339-258.

Broom, Cecil A., to Powers, Richard J. Special synchronizer. 3,588,241, Cl. 353-94.

Brouwer, Frans; and Sobchak, Frank L. Stewart-Warner Corporation Facsimile commutator scanning strip. 3,588,342, Cl. 178-7.6

Brouwer, Frans; and Sobchak, Frank L., to Stewart-Warner Corporation. Facsimile optical scanner assembly. 3,588,343, Cl. 178-7.6

Browatzki, Kurt: *See—*
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Wasser, Willi; Browatzki, Kurt; Friedsam, Joseph; and Heidenreich, Max,3,587,962.

Brown, Boveri & Cie Aktiengesellschaft: *See—*
Stehle, Max; and Kirchner, Egon, 3,587,953.

Brown, Cicero C. Hydraulic open hole well packer. 3,587,736, Cl. 166-187.

Brown, Daniel N., to United States of America, Navy. Hollow core instrument cable. 3,587,310, Cl. 73-170.

Brown, Gaylord W.: *See—*
Russell, Edward J.; Brown, Gaylord W.; Adams, Gary A.; and Dorman, Denis J.,3,587,816.

Brown, George M., to Sauna International, Inc. Multi point releasable coupling. 3,587,141, Cl. 24-205.17

Brown, Gerald N., to Owens-Illinois, Inc. Article suspension and carrying container. 3,587,836, Cl. 206-8.

Brown, Jerry C., to Champion Corporation, mesne. Tap cutter. 3,587,194, Cl. 51-241.

Brown, Lawrence Russell, to AGSCD Chemicals Inc. Metering device. 3,587,938, Cl. 222-228.

Brown Machine Company of Michigan, Inc.: *See—*
Russell, Edward J.; Brown, Gaylord W.; Adams, Gary A.; and Dorman, Denis J., 3,587,816.

Brown, Richard D.: *See—*
Makuch, John A.; and Brown, Richard D.,3,587,487.

Brown, Scott W.; and Ward, Owen K., to Milestone, Inc. Sizing machine for potatoes and the like. 3,587,854, Cl. 209-102.

Brownell, Roy D.; and Rogers, Richard E., to Baldwin-Lima-Hamilton Corporation. Tree harvester boom elevation control. 3,587,682, Cl. 144-3.

Broyles, Harry C., to Granger Associates. Antenna construction with low Q radiators. 3,588,904, Cl. 343-792.5

Bruch, Walter, to Telefunken Patentverwertungsgesellschaft m.b.H. Circuit for modifying the color information of a television signal. 3,588,321, Cl. 178-5.2

Bruninghaus & Co. Bezett KG: *See—*
Meckler, Edgar, 3,587,449.

Bryan Donkin Company Limited, The: *See—*
Farrer, Sydney; and Doe, Ernest Edward, 3,587,628.

Bryan, Max B. Wind tunnel model damper. 3,587,306, Cl. 73-147.

Bryce, William Dean, to United Kingdom of Great Britain and Northern Ireland, Minister of Technology in Her Britannic Majesty's Government of the. Combustion devices. 3,587,232, Cl. 60-39.72

Bsirske, Leo: *See—*
Froitzheim, Hans; Letzel, Karl; and Bsirske, Leo,3,588,168.

Buch, Hans-Joachim, to Walther-Buromaschinen GmbH. Magnetic electric switch without contacts. 3,588,549, Cl. 307-309.

Buchheit, Otto Karl: *See—*
Reichrath, Ernst Georg; and Buchheit, Otto Karl,3,588,044.

Buck, Daniel C., to Westinghouse Electric Corporation. Miniaturized ferrite phase shifters for electronically steered antenna arrays. 3,588,901, Cl. 343-741.

Buck, Daniel C.; and Peterson, Noel C., to Westinghouse Electric Corporation. Microwave ferrite film circuit configuration. 3,588,759, Cl. 333-84.

Buck Engineering Co., Inc.: *See—*
Keen, Harry Joseph, 3,588,609.

Buckingham, Arthur G.; Miller, James A.; and Shapiro, George, to Westinghouse Electric Corporation. Orbit position control of planar reflector satellites. 3,588,000, Cl. 244-1.

Buckwalter, Richard H., to Westinghouse Electric Corporation. Armature for electromagnetic device. 3,588,769, Cl. 335-230.

Buddrus, Curt. Hydraulic marine propulsion system. 3,587,511, Cl. 115-34.

Budenstein, Irwin R.; Reed, Richard J.; and Johnson, Arthur U., to Xerox Corporation. Forms registration apparatus. 3,587,812, Cl. 197-133.

Buebel, Edgar W., Jr.; and King, Ronald J., to United States of America, Navy. Pulse distribution modifier. 3,588,662, Cl. 318-696.

Buffalo Brake Beam Company: *See—*
Veasman, Frank Kenneth, 3,587,791.

Bugaenko, Boris Andreevich; and Koltygo, Vasily Dmitrievich. Stopper for anchor chain. 3,587,507, Cl. 114-200.

Bullinger, Hans B.: *See—*
Hilborn, Edwin H.; and Bullinger, Hans B.,3,588,874.

Bunker-Ramo Corporation, The: *See—*
Greenblum, Carl, 3,588,547.
Kailus, William A., 3,588,789.

Burdette, George W.: *See—*
Couch, Dean H.; and Burdette, George W.,3,587,321.

Burdick, Thomas H.: *See—*
Hagan, William K.; and Burdick, Thomas H.,3,587,564.

Burekhin, Viktor Vasilievich: *See—*
Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich,3,587,673.

Burk, Lowell E. Variable output gear pump or motor apparatus. 3,588,295, Cl. 418-21.

Burke, Aiun, to Contraves AG. Fluidic component with fluid logic element. 3,587,614, Cl. 137-81.5

Burlington Industries, Inc.: *See—*
Duncan, Oliver C., 3,588,832.

Burne, Frederick A., to Olin Mathieson Chemical Corporation. Heat exchanger formed by modules. 3,587,732, Cl. 165-158.

Burnier, Pierre, to Societe Generale de Constructions Electriques et Mecaniques. Method and device for circulating a cryogenic liquid within a body immersed in the cryogenic liquid. 3,588,312, Cl. 174-15.

Burns, David Guthrie: *See—*
Spencer, Alexander; Blake, Alan Francis; and Burns, David Guthrie,3,587,459.

Burrett, Kenneth Frederick, to United Gas Industries Limited. Small unit construction gas meters. 3,587,315, Cl. 73-268.

Burroughs Corporation: *See—*
Dugeny, Pierre L.; Gerain, Jean R.; Quinaud, Michel C.; and Zangheri, Daniel C., 3,587,813.
Pedersen, John H.; Malmer, Michael M., Jr.; Hebeler, Charles B.; and Chang, Hoy Ying, 3,588,834.
Schwartz, Harold L., 3,588,543.

Burrows, Milford D.; and Quedens, Phillipp J., to Stanley Works, The. Router. 3,587,387, Cl. 90-12.

Burtis, Winfield R.: *See—*
Henry, James; and Burtis, Winfield R.,3,587,199.

Bury, Elmer J.: *See—*
Blazek, Donald F.; Bury, Elmer J.; Moore, Robert W.; and Smith, Oliver J.,3,587,419.

Bush, Thomas P., Jr.; and Grant, Samuel E. Debarking machine. 3,587,684, Cl. 144-208.

Butler, William F., to United States of America, Navy, mesne. Ensemble threshold detector. 3,588,723, Cl. 329-204.

Butts, Andrew Wilson. Manually operated valve for sprinkler head. 3,587,979, Cl. 239-569.

Buzano, Michel, to Societe Rhodiaceta. Variable denier yarn. 3,587,221, Cl. 57-140.

Buzzards Corporation, The: *See—*
Francis, Samuel A., 3,588,794.

Byrne, Thomas M.; and Leoff, Arkady, to International Business Machines Corporation. Article transport system and method. 3,588,176, Cl. 302-2.

Byrns, Paul D.: *See—*
Rash, Ross D.; Anderson, Duane H.; Nelson, Hilding E.; and Byrns, Paul D.,3,588,837.

Byrum, Grover E.; Doty, Myron L.; Hendricks, Charles O.; and Jennings, Floyd Robert, to Service Engineering, Inc. Rotary vibratory feeder. 3,587,833, Cl. 198-220.

Bywater, Richard T. Paint roller cleaner. 3,587,599, Cl. 134-138.

Cable Covers Limited: *See—*
Edwards, Hugh Jeremy Willis, 3,587,392.

Cafissi, Roberto: *See—*
Luna, Agostino; and Cafissi, Roberto,3,588,746.

Cal-Tav, Inc.: *See—*
Callanan, Joseph R., 3,588,083.
Callanan, Joseph R., 3,588,084.

Calistrat, Mircea, to Koppers Company, Inc. Stacking system for paperboard blanks. 3,587,830, Cl. 198-170.

Callanan, Joseph R., to Cal-Tav, Inc. Jig for mounting electrical outlet boxes. 3,588,083, Cl. 269-98.

Callanan, Joseph R., to Cal-Tav, Inc. Mounting jig for electrical outlet boxes. 3,588,084, Cl. 269-98.

Callet, Joseph, to Appareillage Thermoflex. Fuel-oil burner control system. 3,588,299, Cl. 431-78.

Cam Gears Limited: *See—*
Adams, Frederick John, 3,587,646.

Cambridge Memory Systems, Inc.: *See—*
McCormack, Thomas L.; Morin, Maurice A.; and Staffiere, Donald T., 3,588,852.

Campbell, David D.: *See—*
Drutchas, Gilbert H.; Clark, Hubert M.; and Campbell, David D.,3,588,192.

Campbell, Dudley H.: *See—*
Edwards, Joseph Arthur, Jr.; Bishop, Vernon; Geci, Melan; and Campbell, Dudley H.,3,588,778.

Campbell, Hugh W., to National Cash Register Company, The. Adhesive and sealant dispenser with grinding means. 3,587,982, Cl. 241-62.

Campbell, Robert J.; and Koch, Roland W., to Collins Radio Company. Peak-slope frequency discriminator. 3,588,534, Cl. 307-233.

Camras, Marvin, to IIT Research Institute. Video recording system and method. 3,588,334, Cl. 178-6.6

Camras, Marvin, to IIT Research Institute. Bulk demagnetizer system and method. 3,588,623, Cl. 317-157.4

Canadian Westinghouse Company, Limited: *See—*
Kolator, Tadeusz W., 3,587,168.

Candella, Vick C. Record cleaning device. 3,588,123, Cl. 274-47.

Cane Machinery & Engineering Co., Inc.: *See—*
Willett, Harold A.; and Giardina, Jacob A., 3,587,214.

Cannon, John G., to Westinghouse Air Brake Company. Locomotive brake control apparatus suited for remote multiple unit operation. 3,588,185, Cl. 303-20.

Cantral, John Isaac; and Taube, Robert Otto, to Deere & Company. Row marker. 3,587,750, Cl. 172-130.

Capriola, Ralph L., to Pullman Incorporated. Valve. 3,587,648, Cl. 137-625.44

Cardiac Electronics, Inc.: *See—*
Tatoian, George, 3,587,565.

Cardozo, Danforth, Jr.: *See—*
Grieb, Geoffrey E.; and Cardozo, Danforth, Jr.,3,587,793.

Cardwell Westinghouse Company: *See—*
Peterson, Bertil E., 3,587,871.

Carius, Wolfhard: *See—*
Schrewe, Hans; Kobusch, Helmut; Liestmann, Wolf-Dietrich; Carius, Wolfhard; Vom Ende, Hans; Frenken, Klaus; and Vogt, Gerd,3,587,719.

Carleton, John T., to Du Pont de Nemours, E. I., and Company. Method of and apparatus for vacuum metallizing. 3,588,308, Cl. 13-31.

Carlson, Elmer Victor; Cross, Floyd Warren; and Killion, Mead Clifford, to Industrial Research Products, Inc. Miniature acoustic transducer of improved construction. 3,588,383, Cl. 179-119.

Carlsson, Gosta: *See—*
Ohlin, Lars Erik; Lofvenmark, Jan Olof; and Carlsson, Gosta,3,587,676.

Carmet Company: *See—*
Schnellman, Oscar; and Stier, Henry Willy, 3,587,192.

Carmody, Joseph Thomas. Apparatus for palletizing cans, jars, bottles or other containers. 3,587,875, Cl. 214-6.

Carothers, Charles H., to Westinghouse Electric Corporation. Explosive circuit interrupting device. 3,588,773, Cl. 337-30.
Carpenter and Paterson Inc.: *See—*
Ebner, Merrill L., 3,587,589.
Carrier Corporation: *See—*
Raleigh, William F , 3,587,558.
Carrieri, Louis F.; and Spanke, Edwin A., to U.S. Industries, Inc. Compression molding machine. 3,587,135, Cl. 18-16.
Carter, James B., Ltd.: *See—*
Wernicke, Walter Henry, 3,587,548.
Cartridge Television, Inc.: *See—*
Protas, Arthur I., 3,588,378.
Cartwright, John Anthony, to Painton & Company Limited. Rotary electrical switches and contact members therefor. 3,588,392, Cl. 200-11.
Case, Laura K.: *See—*
Bartlett, Richard F.; and Case, Laura K.,3,587,465.
Caserta, Thomas A. Composite annular sealing element. 3,588,133, Cl. 277-235.
Casey, Earl Martin. Hydraulic formation packing. 3,587,741, Cl. 166-278.
Casson, Charles F., to AMF Incorporated. Alternating current switching apparatus with improved electrical contact protection and alter- nating current load circits embodying same. 3,588,605, Cl. 317-11.
Castell, Edgar O. G.: *See—*
Dearden, Alan; Castell, Edgar O. G.; and Hylton, Leslie,3,587,712.
Cater, Jack; Johnson, Fred W.; and Wehmer, Bruno F., to International Business Machines Corporation. Dictating and transcribing apparatus with rapid transcriber alignment and movement facilities. 3,588,119, Cl. 274-4.
Caterpillar Mitsubishi Ltd.: *See—*
Furukawa, Teruo, 3,588,195.
Caterpillar Tractor Company: *See—*
Slade, Peter M., 3,587,766.
Caveney, Frank, to Federal Pacific Electric Company. Thermostat. 3,588,774, Cl. 337-100.
Caywood, Shirley A.; and Neuvirth, Clarence L., to Wall Street Dynamics, Inc. Crayon and color media. 3,588,260, Cl. 404-49.
Cecil, Harry Hamilton: *See—*
Beach, John Myers; Oglesbee, Edgar Crain; White, Arthur Roger; Ziegler, George Stephen; and Cecil, Harry Hamilton,3,587,788.
Centre National de la Recherche Scientifique (CHRS) Office National d'Etudes et de Recherches Aerospatiales:*See—*
Moret-Bailly, Jacques, 3,588,251.
Ceravolo, Frank J. Tourniquets. 3,587,585, Cl. 128-327.
Cerberus AG: *See—*
Scheidweiler, Andreas, 3,588,892.
Cerny, Anton, Jr. Collapsible skibob. 3,588,138, Cl. 280-16.
Cerola, Joseph J., to Jenn-Air Corporation. Ventilated range. 3,587,555, Cl. 126-1.
Cessna Aircraft Company: *See—*
Mc Farland, James W.; and Miller, Wendell E., 3,587,765.
Chalco Engineering Corporation: *See—*
Bevis, Jeffrey M., 3,588,650.
Chaltelon, Andre Edouard Joseph; Lerouge, Claude Paul Henry; and Louboutin, Herve Jean Pierre Marie. International Standard Electric Corporation Encoder for wide band signals. 3,588,876, Cl.
Chamberland, Jean Thomas, to Mecanada Limited. Frictional and positive progressive engagement clutch. 3,587,799, Cl. 192-53.
Chambers, William W., to Robertshaw Controls Company. Sequential loading temperature control system. 3,588,471, Cl. 219-486.
Chambon, Louis Jean, to Societe d'Etudes de Machines Speciales Societe Anonyme. Dampening system for rotary offset press. 3,587,460, Cl. 101-148.
Champion Corporation: *See—*
Brown, Jerry C., 3,587,194.
Chan, Joseph Y.; and Gupta, Dinesh C., to General Telephone & Electronics Laboratories, Incorporated. Pulse generating apparatus. 3,588,541, Cl. 307-252.
Chancellor, Miles F.: *See—*
Courtney, John G.; Chancellor, Miles F.; Chancellor, Paul R.; and Thrasher, Kenneth E.,3,587,597.
Chancellor, Paul R.: *See—*
Courtney, John G.; Chancellor, Miles F.; Chancellor, Paul R.; and Thrasher, Kenneth E.,3,587,597.
Chang, Hoy Ying: *See—*
Pedersen, John H.; Malmer, Michael M., Jr.; Hebeler, Charles B.; and Chang, Hoy Ying,3,588,834.
Chang, Kern K. N.; Prager, Hans John; and Weisbrod, Sherman, to RCA Corporation. UHF or L band non-free-running avalanche diode power amplifying frequency synchronized oscillator. 3,588,735, Cl. 331-47.
Charbonnages De France: *See—*
Belugou, Pierre; and De Chaumont, Jean, 3,587,318.
Charmel, Patrick D. Handle and pouring spigot for containers. 3,587,928, Cl. 222-91.
Chattanooga Pharmacal Company: *See—*
Walker, Jack M., 3,587,578.
Chau, Henry H. M., to United States of America, Atomic Energy Commission. Holographic interferometer for isopachic stress analysis. 3,587,301, Cl. 73-88.
Chelminski, Stephen V.; and Delano, Anthony J., to Bolt Associates, Inc. Solenoid valve structures and systems. 3,588,039, Cl. 251-141.
Chemical Construction Corporation: *See—*
Richardson, Harry L.; and Cranston, George E., 3,588,070.
Chemtoy Corporation: *See—*
Gunderson, Arnold J., 3,588,109.
Chen, Cheng-Lin; Zollweg, Robert J.; and Ennulat, Dietrich F., to Westinghouse Electric Corporation. Alumina-rare earth oxide ceramic to metal seals for containing high temperature vapors. 3,588,573, Cl. 313-221.
Chenin, Claude: *See—*
Miniovitch, Wladimir; and Chenin, Claude,3,587,999.
Chenoweth, David V., to Baker Oil Tools, Inc. Fluid shock wave oscillator and fluidic pump. 3,588,282, Cl. 417-65.
Chiffey, Edward, 1/2 to Watson, Robert, & Company (Constructional Engineers) Limited. Automatic welding apparatus. 3,588,418, Cl. 219-98.
Chiffoleau, Robert R.; and Papalia, Rocco, to Kaiser Gypsum Company, Inc. Bracing device for wall constructions. 3,588,082, Cl. 269-49.
Childress, Clyde O.; and Day, John, to Electrostatic Printing Corporation of America, mesne. Offset printing on curved surfaces. 3,587,455, Cl. 101-35.
Childs, Robert L. Combined container and dispensing cap. 3,587,937, Cl. 222-213.
Cho, Viktor. Drilling jig. 3,587,362, Cl. 77-62.
Chow, Chao K.; and Liu, Chao N., to International Business Machines Corporation. Mutual information derived tree structure in an adaptive pattern recognition system. 3,588,823, Cl. 340-146.3
Chow, Ken Tang, to Electro Nuclear Laboratories, Inc. Thermally stabilized laser. 3,588,737, Cl. 331-94.5
Christensen, Alton O., to Shell Oil Company. Sense amplifier for single device per bit MOSFET memories. 3,588,844, Cl. 340-173.
Christensen, Ferdinand. Method and machine for the manufacture of pom-pom bows. 3,587,946, Cl. 223-46.
Christianson, Lynn M. Fiber handling and cleaning device. 3,587,858, Cl. 209-257.
Christoffers, Elimar: *See—*
Heine, Gunter; Droge, Carsten; Ludemann, Joseph; Koch, Ingo; and Christoffers, Elimar,3,588,649.
Chrysler Corporation: *See—*
Platzer, George E., Jr., 3,588,231.
Sarto, Jorma O., 3,587,541.
Chute, Richard, to Eaton Yale & Towne Inc. Inflatable vehicle safety apparatus. 3,588,140, Cl. 280-150.
Ciba-Geigy Corporation: *See—*
Hennart, Claude; Martin, Georges; and Balland, Jean Claude, 3,587,968.
Ciecierski, Jean, to Thomson-CSF. Magnetic elements mounted on the corners of the screen of color television tubes for compensating for the effect of the terrestrial magnetic field. 3,588,583, Cl. 315-8.
Cincinnati Milacron Inc.: *See—*
Losey, Jerry E., 3,588,613.
McCash, Robert M.; and Dever, Lewis A., 3,587,359.
Pekelharing, Adrianus J.; and de Bruyn, Hendrik E., 3,588,431.
Sederberg, George W., 3,587,381.
Ciochetto, Joseph J., to Koppers Company, Inc. Starting bar for horizontal continuous casting apparatus. 3,587,716, Cl. 164-274.
Clapp, Charles C.: *See—*
Blickenderfer, Charles, Jr.; Erickson, Harold E.; and Clapp, Charles C.,3,587,153.
Clark Equipment Company: *See—*
Hansen, Howard C., 3,587,818.
Clark, Hubert M.: *See—*
Drutchas, Gilbert H.; Clark, Hubert M.; and Campbell, David D.,3,588,192.
Clark, John H.; and Bache, Rene C. Facsimile signal modification reducing the information channel band-width. 3,588,330, Cl. 178-6.
Clark Manufacturing Company: *See—*
Bayne, William Elbert, 3,588,139.
Clark, Otto A.: *See—*
Murgas, Karl M.; Greenberg, Burton; and Clark, Otto A.,3,588,244.
Clarke, Chapman & Co. Limited: *See—*
Hryniszak, Waldemar, 3,587,724.
Clary Datacomp Systems Inc.: *See—*
Young, Virgil F.; and Pebenito, Amable A., 3,588,379.
Clay, Haile S., to United States of America, Atomic Energy Commission. Overpressure relief valve having a fail-safe releasable valve stem guide. 3,587,632, Cl. 137-543.
Clay, John A., to Turnbull Marine Design Company Limited. Tail-shaft bearing assembly. 3,587,509, Cl. 115-34.
Clements, Edward H., to Exline, Inc. Air starter valve control system for a multi- cylinder engine. 3,587,228, Cl. 60-16.
Clift, Eugene Emerson. Automatic scoring system. 3,588,869, Cl. 340-323.
Clinkenbeard, Charles R., to McGraw-Edison Company. Lightning arrester venting means. 3,588,578, Cl. 313-325.
Clover, Merritt A. Paddle key. 3,588,340, Cl. 178-108.
Cobb, Richard O.; and Lipp, James, to International Business Machines Corporation. Character checking apparatus for optical character generator. 3,588,820, Cl. 340-146.1
Cohen Electronics, Inc.: *See—*
Ahrens, Harold R., 3,588,673.
Cohen, Marvin M.; Penar, James D.; and Kurtz, David W., to United States of America, Army. Hot-pressed semiconductor diode switch. 3,588,634, Cl. 317-234.

Cohen, Maurice. Vertically adjustable standard. 3,588,023, Cl. 248-410.

Coleman, Clarence B., to Fabricated Metals, Inc. Container discharge system. 3,587,637, Cl. 137-577.5

Coleman, Edgar Padbury. Seal for relatively rotating members. 3,588,127, Cl. 277-92.

Collins Radio Company: *See—*
Campbell, Robert J.; and Koch, Roland W., 3,588,534.
Pitts, Robert D.; and Mc Allister, Lewis L., 3,587,391.
Tollefson, Robert D., 3,588,732.

Colombet, Georges: *See—*
Lami, Rene; and Colombet, Georges,3,588,477.

Colonial Sugar Refining Company Limited, The: *See—*
Dwyer, Francis Bosworth, 3,587,849.

Columbia Controls Research Corporation: *See—*
Vaccaro, Angelo; and Dixon, Harold F. E., 3,588,332.
Vaccaro, Angelo, 3,588,826.

Com-Tech, Incorporated: *See—*
Alper, Fred, 3,587,810.

Combustion Engineering, Inc.: *See—*
Makuch, John A.; and Brown, Richard D., 3,587,487.
Martin, Bill G., 3,587,490.

Comcet Incorporated: *See—*
Rash, Ross D.; Anderson, Duane H.; Nelson, Hilding E.; and Byrns, Paul D., 3,588,837.

Commander, Frederick Vincent: *See—*
Haigh, Richard Woolliscroft; and Commander, Frederick Vincent,3,587,950.

Commercial Solvents Corporation: *See—*
Riotto, Dominic J., 3,587,936.

Community Linen Rental Service: *See—*
Mohr, Robert A.; and Medley, Walter S., 3,587,621.

Compagnie d'Applications Mecaniques al'Electronique au Cinema et a l'Atomistique (C.A.M.E.-C.A.):*See—*
Guernet, Jacques, 3,587,879.

Compagnie de Saint Gobain: *See—*
Theobald, Reiner; and Luc-Belmont, Stephane, 3,587,915.

Compagnie Des Compteurs: *See—*
Varaut, Bernard, 3,587,552.

Compagnie des Freins et Segmaux Westinghouse: *See—*
Desthuilliers, Jean Pierre, 3,587,327.

Compagnie Internationale Pour l'Informatique:*See—*
Ling, Andrew T., 3,588,845.

Compton, John R. Sit-in shower and bath tub, both with driers. 3,587,118, Cl. 4-146.

Computervision Corporation: *See—*
Willis, Gordon, 3,587,334.

Concentric Engineering Company: *See—*
Hemphill, Charles Wayne; and Goldkuhle, Werner Peter, 3,587,448.

Concord Fabrics, Inc.: *See—*
Grieb, Geoffrey E.; and Cardozo, Danforth, Jr., 3,587,793.

Congleton, David B.; Glazer, Sydney; and Armstrong, Melvin S., to National Cash Register Company, The. Character recognition system employing continuity detection and registration means. 3,588,818, Cl. 340-146.3

Connett, Donald C.; and Whited, Arthur R., Jr., to Sperry Rand Corporation. Power transmission. 3,587,403, Cl. 91-504.

Connolly, Patrick W., to Visi-Trol Engineering Company. Stud feeding apparatus. 3,587,909, Cl. 221-93.

Conrad, Richard A., to Switchcraft, Inc., mesne. Illuminated pushbutton switch and potentiometer assembly. 3,588,420, Cl. 200-167.

Conrad, William M.: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,588,705.

Conradty, C.: *See—*
Kegel, Kurt; Zollner, Dieter; Reichelt, Bernhard; and Koziol, Konrad, 3,588,307.

Conte, Joseph. Portable cable saw. 3,587,679, Cl. 143-32.

Conti, Fulvio. Apparatus for the finishing of fabrics stretched wide, particulary for their continuous washing. 3,587,255, Cl. 68-38.

Continental Oil Company: *See—*
Schaal, Doyle H., 3,588,885.

Contraves AG: *See—*
Burke, Aiun, 3,587,614.

Control Data Corporation: *See—*
Erickson, Keith O., 3,588,425.

Cook, Harold D., to Teletype Corporation. Tester for in-circuit saturated transistors and methods of testing in-circuit saturated transistor. 3,588,697, Cl. 324-158.

Cooper, Alan G., to Sprague Electric Company. Leadless solid electrolyte tantalum capacitor. 3,588,626, Cl. 317-230.

Cooper, Alan G.: *See—*
Miller, David S.; Fresia, Elmo James; and Cooper, Alan G.,3,588,631.
Miller, David S.; Presia, Elmo James; and Cooper, Alan G.,3,588,630.

Cooper, Julius, to Ideal Toy Corporation. Toy robot. 3,587,191, Cl. 46-247.

Cooper, Paul William: *See—*
Wilkinson, Wilfred Henry; and Cooper, Paul William,3,588,267.

Cope, Geoffrey W., to Dresser Industries, Inc. Automatic hydraulic-mechanical coupler positioning device. 3,587,870, Cl. 213-15.

Copeland, John A., III; and Spiwak, Robert R., to Bell Telephone Laboratories, Incorporated. LSA oscillator with first, second and third harmonic circuits for increased efficiency. 3,588,742, Cl. 331-96.

Copeland Refrigeration Corporation: *See—*
Gannaway, Edwin L.; and Draper, Robert M., 3,587,406.

Coppin, William P., Jr.: *See—*
Brenneman, George B.; and Coppin, William P., Jr.,3,588,301.

Corbett, Robert B. Alignment measurement. 3,587,303, Cl. 73-103.

Cork, Dale J. Meadows, W. R., Inc. Protective course for bridge deck. 3,587,964, Cl. 238-2.

Cornelius, Company, The: *See—*
Cornelius, Richard T., 3,587,918.
Keller, Paul, 3,587,925.

Cornelius, Richard T., to Cornelius, Company, The. Comestible dispensing machine. 3,587,918, Cl. 221-96.

Corning Glass Works: *See—*
Langley, Lawrence W., 3,587,610.
Nelson, Carl J., 3,587,554.
Watson, James H. P., 3,588,223.
Ziver, Garo M., 3,588,448.

Corrigall, Don J., to Miller Electric Manufacturing Company. Motor speed control circuit having feedback responsive to load power demand. 3,588,653, Cl. 318-331.

Corrugated Packing & Sheet Metal Company Limited, The: *See—*
Nicholson, Terence P., 3,588,131.

Cosden, Thomas H.: *See—*
Tucker, James W.; and Cosden, Thomas H.,3,587,308.

Couch, Dean H.; and Burdette, George W., to United States of America, Navy. Glass pressure measuring apparatus. 3,587,321, Cl. 73-418.

Coulter Electronics, Inc.: *See—*
Rothermel, William Fletcher, 3,588,053.

Courtney, John G.; Chancellor, Miles F.; Chancellor, Paul R.; and Thrasher, Kenneth E. Device for washing soft drink syrup containers. 3,587,597, Cl. 134-95.

Cova, Francois. Control device for cycloconverters. 3,588,668, Cl. 321-5.

Cowley, William E.; and McCord, Wilfred M., Jr., to Vermont American Corporation. Transportable hose reel. 3,587,626, Cl. 137-355.12

Cox, John R.; and Mix, Joseph E., to Balas Collet Company. Tool holder. 3,587,124, Cl. 10-135.

Cox, Ronald W.; and Anderson, Arthur L., to General Motors Corporation. Resistance sensing supervisory system. 3,588,890, Cl. 340-409.

Cozeck, Anthony J.; Otero, Ruben Q.; and Pierce, Walter E. Bracket for electrical boxes. 3,588,019, Cl. 248-228.

Crane Packing Company: *See—*
McKillop, George R.; Tankus, Harry; and Thayer, James H., 3,588,126.

Cranston, George E.: *See—*
Richardson, Harry L.; and Cranston, George E.,3,588,070.

Crawford, Bobby D., to Fan Clutch Inc. Clutch for an automobile fan. 3,587,800, Cl. 192-58.

Crawford, Harry F. Variable impedance system for electrical cable fault locating and temperature monitoring. 3,588,689, Cl. 324-52.

Creed, John W., Jr.; and Paffrath, Edgar C., to General Motors Corporation. Fluidic control with a reset control. 3,587,612, Cl. 137-81.5

Creith, Lou C., to Olin Mathieson Chemical Corporation. Floating deck for storage tank. 3,587,911, Cl. 220-26.

Cribb, Herbert E., to United States of America, National Aeronautics and Space Administration. Protective suit having an audio transceiver. 3,588,359, Cl. 179-1.

Cricchi, James Ronald, to Westinghouse Electric Corporation. Shift register using metal oxide silicon transistors. 3,588,526, Cl. 307-221.

Cricchi, James Ronald, to Westinghouse Electric Corporation. Shift register using complementary induced channel field effect semiconductor devices. 3,588,527, Cl. 307-221.

Crisfield, Lloyd F.; and Rosner, Tobias S., to Cruslu Corporation. Earring formed of dessinilar half rings. 3,587,247, Cl. 63-14.

Crompton & Knowles Corporation: *See—*
Dion, Raymond F., 3,587,660.

Crookshanks, Rex J.; and Roberts, Don G., said Roberts assor. to United States of America, Navy, mesne. Multiphase voltage controlled oscillator. 3,588,733, Cl. 331-2.

Cross, Floyd Warren: *See—*
Carlson, Elmer Victor; Cross, Floyd Warren; and Killion, Mead Clifford,3,588,383.

Cruden, John L., Jr. Method of forming a piped opening. 3,587,501, Cl. 112-264.

Crump, Woodford J., to Monogram Industries, Inc. Tandem motor assembly. 3,588,297, Cl. 418-212.

Cruslu Corporation: *See—*
Crisfield, Lloyd F.; and Rosner, Tobias S., 3,587,247.

Crystal Tissue Company: *See—*
Fleischer, Leo, 3,587,525.

Csaba, Elmer L.; and Engel, Edward W., to SCM Corporation. Sheet feeding apparatus. 3,588,106, Cl. 271-61.

CSF-Compagnie Generale de Telegraphie Sans Fils: *See—*
Lami, Rene; and Colombet, Georges, 3,588,477.
Wendt, Georg, 3,588,468.

Culler, John H.: *See—*
Wellford, Armistead L.; and Culler, John H.,3,588,669.
Culp, Fred E.: *See—*
Van Brimer, Russell H.; and Culp, Fred E.,3,588,906.
Cumming, James C., to North American Rockwell Corporation. Brake control system. 3,588,189, Cl. 303-21.
Cunningham, McCleery B.; Woods, Auburn, Jr.; and Dunlap, Charles K., Jr., to Sonoco Products Company. Impregnated tubular article. 3,587,656, Cl. 138-144.
Cunningham, Sinclair Upton: *See—*
Firth, Donald; and Cunningham, Sinclair Upton,3,587,400.
Curwen, Peter W.; and Newell, Richard V., to Mechanical Technology Incorporated. Resonant piston pumps. 3,588,291, Cl. 417-417.
Cutler-Hammer, Inc.: *See—*
Holzer, John M.; and Severson, Palmer T., 3,587,826.
Cybulsky, Kenneth J.: *See—*
Giangarra, Anthony; and Cybulsky, Kenneth J.,3,587,921.
Czetli, Jess, to Alan, I. W. Frank, Corporation, The. Molding apparatus. 3,587,132, Cl. 18-5.
Dadd, Morris V., to Johnson Products, Inc. Hydraulic lash adjuster. 3,587,539, Cl. 123-90.35
Daggett, Evans H., to Air Reduction Company, Incorporated. Pulsed power welding system with suppressed pulse start. 3,588,466, Cl. 219-137.
Dahlem, Billy J.; and Martin, John A., to Power-Curve Conveyor Company. Pallet loading apparatus. 3,587,876, Cl. 214-6.
Dahlstrom, Finn, to General Electric Company. Insulated shaft attachment for rotating conducting ring. 3,588,562, Cl. 310-232.
Daimler-Benz Aktiengesellschaft: *See—*
Froitzheim, Hans; Letzel, Karl; and Bsirske, Leo, 3,588,168.
Reinhard, Theodor; and Haug, Ernst, 3,588,016.
Dal Monte, Giorgio; and Motolese, Francesco, to Societa Italiana Telecommunicazioni Siemens S.p.A. Radiotelephone system for communication between a central office and vehicle-borne mobile units. 3,588,371, Cl. 179-41.
Dalmau Guell, Jose Maria, to Jumberca, S.A. Circular knitting machines. 3,587,253, Cl. 66-50.
Daman, Louis Fawcett, to Singer Company, The. Cam removal unit. 3,587,491, Cl. 112-158.
Damstra, Pieter: *See—*
De Niet, Edmond; and Damstra, Pieter,3,588,333.
Damy, Eduardo M.; and Damy, Sergio Rene. Selectively actuated hopper car doors. 3,587,475, Cl. 105-287.
Damy, Sergio Rene: *See—*
Damy, Eduardo M.; and Damy, Sergio Rene,3,587,475.
Danfoss A/S: *See—*
Leffers, Hans Ulrik; and Romer, Bendt Wegge, 3,587,781.
Mahncke, Heinz; and Valbjorn, Knud Vagn, 3,587,343.
Petersen, Jorgen Hartvig, 3,588,128.
Sturlason, Leif V.; and Sjotun, Kyrre G., 3,588,284.
Daniel Industries, Inc.: *See—*
Stroman, Larry J., 3,588,481.
Daniels, James K. Horn weight assembly. 3,587,571, Cl. 128-76.
Danilov, Edvard Grigorievich: *See—*
Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich,3,587,673.
Danilov, Viktor Petrovich: *See—*
Smirnov, Oleg Alexandrovich; Zubkov, Vyacheslav Ivanovich; and Danilov, Viktor Petrovich,3,587,577.
Dardaine, Edgar J.: *See—*
Berry, Jean-Luc; and Dardaine, Edgar J.,3,587,208.
Dart Industries Inc.: *See—*
Prussin, Samuel; and Mason, Jimmie L., 3,587,941.
Dashkevich, Mikhail Pavlovich. Sliding current leads to machines intended for seam resistance welding. 3,588,434, Cl. 219-84.
Datacap Systems: *See—*
Barnes, Edward D., 3,587,853.
Daugherty, Thomas L.; and Philips, Gerald J., to United States of America, Navy. Rolling contact bearing design which reduces bearing generated noise and fretting corrosion. 3,588,205, Cl. 308-184.
Davern, Donald F., to Hughes Aircraft Company. Automatic tool changer. 3,587,164, Cl. 29-568.
Davidson, Eugene M., to Hudson Products Corporation, mesne. Axial flow fans. 3,588,271, Cl. 415-174.
Davin, John Joseph. Highway intersection warning system. 3,588,805, Cl. 340-31.
Davis, Austin L.: *See—*
Merriam, Layton C.; and Davis, Austin L.,3,587,761.
Davis, Richard P. Method of making sheet metal parts. 3,587,283, Cl. 72-329.
Davis, William E. Classroom boards. 3,587,183, Cl. 40-83.
Dawes, Leslie J., to Bendix Corporation, The. Liquid-to-gas indicator and actuator device. 3,587,398, Cl. 91-419.
Day, Donald F. Multiple compartment structure for trucks. 3,588,166, Cl. 296-24.
Day, John: *See—*
Childress, Clyde O.; and Day, John,3,587,455.
Deakin, Gordon Asquith; Eastwood, Alan; and Vinnicombe, Gordon, to Grace, W. R., & Co. Transfer mechanism. 3,587,819, Cl. 198-20.
Deal, Oliver E. Omnidirectional sign. 3,587,185, Cl. 40-132.
Dearden, Alan; Castell, Edgar O. G.; and Hylton, Leslie, to Hepworth & Grandage Limited. Rotary carrier method and apparatus for centrifugal casting. 3,587,712, Cl. 164-114.
Deboo, Gordon J.; and Hedlund, Roger C., to United Sta s of America, National Aeronautics and Space Administration. Precision rectifier with FET switching means. 3,588,671, Cl. 321-47.
de Bruyn, Hendrik E.: *See—*
Pekelharing, Adrianus J.; and de Bruyn, Hendrik E.,3,588,431.
De Buhr, Edward, to Du Pont de Nemours, E. I., and Company. Heat transfer supply for vacuum metalizer. 3,587,728, Cl. 165-89.
De Carli, John P. Bucket-loader attachment. 3,587,887, Cl. 214-145.
Dechanciaux, Bernard, to Lagain, Georges. Apparatus for stacking bags. 3,587,410, Cl. 93-33.
De Chaumont, Jean: *See—*
Belugou, Pierre; and De Chaumont, Jean,3,587,318.
Deer, James W., to Electronic Specialty Company. Vertical reference system. 3,587,330, Cl. 74-5.6
Deere & Company: *See—*
Cantral, John Isaac; and Taube, Robert Otto, 3,587,750.
Hanser, Paul Edmund, 3,587,640.
Parquet, Donald James; Hall, Daniel Luce; and Gregerson, Stanley Martin, 3,587,399.
Parquet, Donald James; and Hall, Daniel Luce, 3,587,630.
Peak, Charles Benjamin, 3,587,336.
Peak, Charles Benjamin, 3,587,690.
Schlueter, Francis Edward, 3,588,136.
De Gaston, Raoul H. Air-powered wrench. 3,587,365, Cl. 81-58.1
De Jong, Elkan J., to Organon, Inc. Homogenizing device for powdered solids which are not free flowing. 3,588,055, Cl. 259-64.
Delano, Anthony J.: *See—*
Chelminski, Stephen V.; and Delano, Anthony J.,3,588,039.
Delay-action motor energizing control devices: *See—*
Rouvre, Philippe A. R.; Pineau, Jean E. X.; Peroy, Francois; and Delay-action motor energizing control devices,3,588,657.
Del Ben, Reno A.: *See—*
Harvey, Robert J., 3,588,259.
Delisle, Henri. Boot rack. 3,587,864, Cl. 211-37.
Dell, Harold R.; and Florence, Judit K., to Singer-General Precision, Inc. Automatic first-in first-out system. 3,588,847, Cl. 340-173.
Delta Electronics, Inc.: *See—*
Kershner, Stephen W.; and Owen, Kenneth, 3,588,390.
Delves-Broughton, Paul Nicholas, to International Standard Electric Corporation. Water-blocked cartwheel cable. 3,588,313, Cl. 174-28.
Demar, Viking Valentin, to Ekman, Carl Oscar Alexander. Furnaces for solid fuel. 3,587,489, Cl. 110-31.
Demler, Henry William, Sr.; and Weist, Edward Landis, to AMP Incorporated. Vacuum or pressure coupling devices. 3,588,149, Cl. 285-110.
Demuth, Thomas P., to Atlantic Richfield Company. Safety alarm system. 3,588,858, Cl. 340-224.
De Niet, Edmond; and Damstra, Pieter. Device for magnetically recording and reading a television signal. 3,588,333, Cl. 178-6.6
Denker, James M., to Nutron Corporation. Valving. 3,587,650, Cl. 137-625.65
Deramond, Marcel: *See—*
Arene, Francois; and Deramond, Marcel,3,588,250.
De Rieux, Thomas H., to United States of America, Navy. Adjustable lens mount. 3,588,230, Cl. 350-252.
Derossi, Piero. Optical profile projector. 3,588,256, Cl. 356-164.
Derouin, Michael R. Boot sling. 3,587,951, Cl. 224-5.
Des Marais, John; and Sinigoi, Roger A. Convertible desk. 3,588,210, Cl. 312-196.
Desai, Kantilal P.: *See—*
Moore, Edward J.; and Desai, Kantilal P.,3,588,800.
Desthuilliers, Jean Pierre, to Compagnie des Freins et Segmaux Westinghouse. Angular velocity measuring and direction indicating apparatus. 3,587,327, Cl. 73-502.
Detsch, Heinrich, to Siemens Aktiengesellschaft. Circuit arrangement with frequency compensation for attenuation and amplification measurement on electrical quadrupoles. 3,588,691, Cl. 324-57.
Deutsche Gold-und Silber-Scheideanstalt vormals Roessler: *See—*
Schumann, Erwin; and Kuhn, Rudolf, 3,587,149.
Devejian, Kevork. Cassette packaging. 3,587,841, Cl. 206-52.
Develco Corporation: *See—*
Shomo, Robert D., 3,588,152.
Dever, Lewis A.: *See—*
McCash, Robert M.; and Dever, Lewis A.,3,587,359.
Devlin, Archibald S. Trailer warning device. 3,588,809, Cl. 340-52.
Dewan, Shashi B.: *See—*
Duff, David L.; and Dewan, Shashi B.,3,588,667.
Di Camillo, Carmine V., to Bowles Fluidics Corporation. Self pressurizing interaction region. 3,587,609, Cl. 137-81.5
Dick, Burness Carl, to Du Pont de Nemours, E. I., and Company. Apparatus for sorting cylindrical objects. 3,587,850, Cl. 209-73.
Dickey, Baron C.: *See—*
Hunt, Robert P.; Dickey, Baron C.; and Bousky, Samuel,3,588,218.
Diesel Kiki Kabushiki Kaisha: *See—*
Kimberley, John A.; Hussey, Russell B.; Inoue, Takashi; Masuda, Takao; and Harada, Takeshi, 3,587,535.
Dietrich, Michele; and Godley, William P., to Honeywell Inc. Message display apparatus. 3,587,188, Cl. 40-336.
Dilger, Lawrence, to Veeder Industries Inc. High speed counter with electromagnetically operated display. 3,588,459, Cl. 235-92.

Dillarstone, Alan. Safety heater for product dispensed from aerosol container. 3,588,469, Cl. 219-308.

Dills, Raymond L.: *See—*
Henderson, Wayne L.; and Dills, Raymond L.,3,587,557.

Dion, Raymond F., to Crompton & Knowles Corporation. Wear inserts in dobby jack. 3,587,660, Cl. 139-84.

DiOrio, Anthony N., to Micro Magnetic Industries. Article dispenser. 3,587,924, Cl. 221-251.

Dischert, Robert A.; and Thorpe, Laurence Joseph. RCA Corporation Gamma correction and shading modulation circuitry for a television camera. 3,588,338, Cl. 178-7.1

Ditschler, Hans J., to Maschinenfabrik Lorenz AG. Gear shaping apparatus. 3,587,384, Cl. 90-7.

Di Tucci, Daniel A. Flower pot filling machine. 3,587,675, Cl. 141-125.

Dixon, Harold F. E.: *See—*
Vaccaro, Angelo; and Dixon, Harold F. E.,3,588,332.

Dixon, Robert G., to McLauchlan, A. B., Co., Inc. Device for stemming certain berries and fruits. 3,587,686, Cl. 146-55.

Dmeter, I. V., Inc.: *See—*
Smith, Bob L., 3,587,313.

Dobbs, David John Miller; and Linder, Derek, to British Railways Board. Cleaning of rails. 3,588,441, Cl. 219-121.

Doe, Ernest Edward: *See—*
Farrer, Sydney; and Doe, Ernest Edward,3,587,628.

Doherty, Martin C., to General Electric Company. Fluidic input isolation circuit. 3,587,611, Cl. 137-81.5

Dohne, Jan W.: *See—*
Ferris, Ray L.; Shaver, William R.; and Dohne, Jan W.,3,587,477.

Dollekamp, Hendrikus: *See—*
Verhoeven, Leonardus Adrianus Johannes; and Dollekamp, Hendrikus,3,588,328.

Domenighetti, Domenico. Device for hooking, lifting and firmly holding an apparatus on the upper edge of the cargo body to be transported by the truck itself. 3,588,022, Cl. 248-360.

Donlon, Roger M.: *See—*
Grether, Tobias; and Donlon, Roger M.,3,587,216.

Donohoe, John J. Golf driving aid. 3,588,105, Cl. 273-32.

Dorman, Denis J.: *See—*
Russell, Edward J.; Brown, Gaylord W.; Adams, Gary A.; and Dorman, Denis J.,3,587,816.

Dorn, Thomas E.: *See—*
Anthony, Myron L., 3,588,478.

Dorr-Oliver, Incorporated: *See—*
Angevine, Peter A.; and Priestley, Robert J., 3,588,063.
Kristofl, Ferdinand, 3,587,863.
Lee, Graham, 3,587,862.

Dotson, Richard A. Cutting tool ion neutralizer and method. 3,587,367, Cl. 82-1.

Doty, Myron L.: *See—*
Byrum, Grover E.; Doty, Myron L.; Hendricks, Charles O.; and Jennings, Floyd Robert,3,587,833.

Dowdall, Donald H.; Friley, James W.; and Sophy, Daniel A., to Schwenk Sheet Metal Works, Inc. Duct liner fastening apparatus. 3,587,162, Cl. 29-208.

Dowty Technical Developments Limited: *See—*
Flint, John Christopher Eglington, 3,587,636.

Draayer, Johannes, to GTE Automatic Electric Laboratories, Incorporated. Communication matrix testing arrangement. 3,588,386, Cl. 179-175.21

Dragerwerk Heinr. & Bernh Drager: *See—*
Breiling, Hans George, 3,588,057.

Draper, Robert M.: *See—*
Gannaway, Edwin L.; and Draper, Robert M.,3,587,406.

Dresser Industries, Inc.: *See—*
Cope, Geoffrey W., 3,587,870.

Droge, Carsten: *See—*
Heine, Gunter; Droge, Carsten; Ludemann, Joseph; Koch, Ingo; and Christoffers, Elimar,3,588,649.

Druid Plastics, Inc.: *See—*
Baldridge, William Griff, 3,587,137.

Drutchas, Gilbert H.: *See—*
Atkin, Rupert L.; and Drutchas, Gilbert H.,3,588,191.

Drutchas, Gilbert H., to TRW Inc. Hydraulic anti-skid system. 3,588,193, Cl. 303-21.

Drutchas, Gilbert H.; Clark, Hubert M.; and Campbell, David D., to TRW Inc. Hydraulic skid control system. 3,588,192, Cl. 303-21.

Duarte, Robert T., to United States of America, Navy, mesne. Radar composite video processor. 3,588,896, Cl. 343-5.

Dubas, Alexander, to Singer Company, The. Method and apparatus for removing a single ply of fabric. 3,588,092, Cl. 271-19.

Dubravec, Vladimir; and Hirsch, Kurt, to U.S. Philips Corporation. Magnet system for focusing the electron beam in a high-power klystron. 3,588,582, Cl. 315-5.35

Dubus, Gerard: *See—*
Bornstein, Rene; and Dubus, Gerard,3,587,817.

Duckett, John W.; Walker, Grant W.; and Ford, Duane B. Liquid shock absorbing buffer. 3,588,159, Cl. 293-1.

Duda, William L.; and Terman, Lewis M., to International Business Machines Corporation. System for using a memory having irremediable bad bits. 3,588,830, Cl. 340-172.5

Duff, David L.; and Dewan, Shashi B., to Marathan Electric Research of Canada Ltd. Means for controlling back voltage across power thyristors during commutation thereof. 3,588,667, Cl. 321-5.

Duff-Norton Company, Inc.: *See—*
Nestvogel, Dieter K., 3,587,796.

Dugeny, Pierre L.; Gerain, Jean R.; Quinaud, Michel C.; and Zangheri, Daniel C., to Burroughs Corporation. Feed and reverse mechanism for an inking ribbon. 3,587,813, Cl. 197-162.

Dugge, Richard H.; Schipper, Dennis J.; and Smith, Garth R., to ACF Industries Incorporated. Unloading structure for a covered hopper railway car. 3,587,834, Cl. 198-233.

Duncan, Oliver C., to Burlington Industries, Inc. Loom stop data collection system. 3,588,832, Cl. 340-172.5

Duncan, Richard D., to United States of America, Atomic Energy Commission. Glove box turntable cam rotating mechanism. 3,587,333, Cl. 74-88.

Dunkow, John T., to Bendix Corporation, The. Wire grip extractor tool. 3,587,159, Cl. 29-203.

Dunlap, Charles K., Jr.: *See—*
Cunningham, McCleery B.; Woods, Auburn, Jr.; and Dunlap, Charles K., Jr.,3,587,656.

Dunlavy, John H., Jr. Wide range tunable transmitting loop antenna. 3,588,905, Cl. 343-856.

Dunlop Company Limited, The: *See—*
Hanus, Jean, 3,587,703.
Robinson, Peter M.; and Jenkins, Peter J., 3,587,832.

Dunn, Frank A., to Bell Telephone Laboratories, Incorporated. Method of polishing soft, water-soluble crystals. 3,587,196, Cl. 51-326.

Dunning, Walter B.: *See—*
Thomas, Raymond J.; Mc Donald, William G.; and Dunning, Walter B.,3,587,412.

Du Pont de Nemours, E. I., and Company: *See—*
Brill, Harold C., 3,588,503.
Carleton, John T., 3,588,308.
De Buhr, Edward, 3,587,728.
Dick, Burness Carl, 3,587,850.
Smith, Stanley G., 3,587,450.

Du Pont, William W.: *See—*
Aylward, William G.; and Du Pont, William W.,3,587,202.

Duriron Company, Inc., The: *See—*
Mastromatteo, Frank J., 3,588,125.

Dusa, Donald J.: *See—*
Wolf, Jeremiah P.; Sutherland, William V.; and Dusa, Donald J.,3,587,973.

DuVivier, Charles L., to Lee Corporation. Traffic control system and apparatus. 3,588,807, Cl. 340-40.

Dwyer, Francis Bosworth, to Colonial Sugar Refining Company Limited, The. Aligning and sorting bodies. 3,587,849, Cl. 209-73.

Dykeman, George, to United States Steel Corporation. Pulse height analyzer. 3,588,536, Cl. 307-235.

Dym, Herbert, to International Business Machines Corporation. Position transducer using a sweeping field null. 3,588,345, Cl. 178-18.

Dynabulk Corporation: *See—*
Paton, Hamilton Neil King, 3,587,935.

Dynamit Nobel AG: *See—*
Menke, Helmut; and Florin, Hans, 3,587,467.

Dynamit Nobel Aktiengesellschaft: *See—*
Prior, Josef, 3,587,466.

Dysart, Gordon R.: *See—*
Spencer, Arthur M.; Anderson, Arthur L.; and Dysart, Gordon R.,3,587,744.

Dziki, Michael: *See—*
Schultz, George; and Dziki, Michael,3,587,930.

Eastech, Inc.: *See—*
Mc Murtrie, Charles L.; and Rodely, Alan E., 3,587,312.

Eastman Kodak Company: *See—*
Hoelscher, Robert Lehn, 3,588,722.
July, Georges, 3,588,246.
Kilgus, Alfred, 3,587,422.
Morse, John E., 3,587,429.
Nielsen, Asger T.; and Brewer, Donald R., 3,587,418.
Ort, Wolfgang, 3,587,434.
Pierce, Harold C., 3,587,954.
Simon, Horst, 3,587,423.
Sturm, Edward Louis, 3,588,300.
Thomas, Raymond J.; Mc Donald, William G.; and Dunning, Walter B., 3,587,412.

Eastwood, Alan: *See—*
Deakin, Gordon Asquith; Eastwood, Alan; and Vinnicombe, Gordon,3,587,819.

Eaton Yale & Towne, Inc.: *See—*
Berryman, Charles O., 3,588,401.
Chute, Richard, 3,588,140.
Mueller, Robert S., 3,588,187.

Ebner, Merrill L., to Carpenter and Paterson Inc. Decannulation device for tracheal tube. 3,587,589, Cl. 128-351.

Eckart, John W., to Avco Corporation. Torque-indicating device. 3,587,304, Cl. 72-136.

Eckl, James J.; and Griffin, James Thomas, to Square D Company. Solid state heat control and initiating circuit for a resistance welder control. 3,588,435, Cl. 219-108.

Eclipse Lookout Co.: *See—*
Magnuson, Everett E., 3,587,531.

Edmondson, Ronald, to Plastiers Limited of Nathan Way. Seal ring fittings for pipes. 3,588,132, Cl. 277-207.

Edwards, Brian Draycott, to Rolls-Royce Limited. Detonation wave combustion. 3,588,298, Cl. 431-1.

Edwards, Hugh Jeremy Willis, to Cable Covers Limited. Means for controlling the operation of hydraulically operated jackd. 3,587,392, Cl. 91-1.

Edwards, Joseph Arthur, Jr.; Bishop, Vernon; Geci, Melan; and Campbell, Dudley H., to Stackpole Components Company. Combination electric switch and variable resistor. 3,588,778, Cl. 338-172.

Edwards, Richard E., Jr.: *See—*
Bowers, Glenn E.; and Edwards, Richard E., Jr.,3,587,293.

Egan, William E., to General Electric Company. Motor control system with unjunction triggering circuit to compensate for the nonlinearity of an SCR amplifier. 3,588,655, Cl. 318-345.

Eggleston, Philip William, to Imperial Chemical Industries, Limited. Differential shrinkage yarn and fabric made therefrom. 3,587,220, Cl. 57-140.

Eidal International Corporation: *See—*
Eidal, Roy M., 3,587,985.

Eidal, Roy M., to Eidal International Corporation. Metal processing unit. 3,587,985, Cl. 241-138.

Eidophor A.G.: *See—*
Hogg, Heinrich, 3,588,574.

Eigenmann, Ludwig. Roadway surface marking, and marked road. 3,587,415, Cl. 94-1.5

Eisenmann, Wolfhart, to Escher Wyss G.m.b.H. Double-walled tubular heat exchanger. 3,587,729, Cl. 165-95.

Eisenwerk Rothe Erde GmbH: *See—*
Schluter, Wilhelm; and Thonigs, Rolf, 3,587,402.

Ekman, Carl Oscar Alexander: *See—*
Demar, Viking Valentin, 3,587,489.

Elazar, Shmuel, to Bell & Howell Company, mesne. Impedance bridge transducer circuits. 3,588,728, Cl. 330-69.

Electric Wireline Specialties, Inc.: *See—*
Owen, Arthur L., 3,587,735.

Electro Nuclear Laboratories, Inc.: *See—*
Chow, Ken Tang, 3,588,737.

Electro Tech Appliance Service Limited: *See—*
Head, William John, 3,588,868.

Electro-Voice, Incorporated: *See—*
Negley, Marvin C., 3,588,384.

Electrocopy Corporation: *See—*
Bentzman, Louis, 3,588,024.

Electronic Control Corporation: *See—*
Harwell, Jack B., 3,588,647.
Rasmussen, Clarence E., 3,588,674.

Electronic Specialty Company: *See—*
Deer, James W., 3,587,330.

Electronic Traffic Control, Inc.: *See—*
Gustus, Rolfe T., 3,588,808.

Electrostatic Printing Corporation of America: *See—*
Childress, Clyde O.; and Day, John, 3,587,455.

Elitex, Zavody textilniho strojirenstvi: *See—*
Kostelecky, Premysl, 3,587,990.

Elle, Klaus: *See—*
Woltche, Walter; and Elle, Klaus,3,588,229.

Ellefson, Clarence L., to Park-O-Matic Mfg., Inc. Combination card unlock mechanism. 3,588,397, Cl. 200-44.

Ellis, George E.: *See—*
Van Der Sluys, Peter C.; Ellis, George E.; Levine, Louis; and Modrow, Fred P.,3,588,658.

Ellis, Gus M., Jr.; and McCoy, William J., Jr., to Savage, W. J., Company, Inc. Food pump. 3,588,177, Cl. 302-14.

Ellis, Peter H., to Rohr Corporation. Turbo-fan propulsion apparatus with silencer operating method. 3,587,777, Cl. 181-33.

Ellis, Peter H., to Rohr Corporation. Sound suppression nozzle structure for fan-jet aircraft engine. 3,587,778, Cl. 181-33.

Ellis, Roy T., to Rubber-Seal Products Company, Inc. Conversion kit adapter for dispensers. 3,587,940, Cl. 222-383.

Ellms, Robert W.; and Abraham, Edward D., to Sherwin-Williams Company, The. Foundry sand article forming machine. 3,587,714, Cl. 164-201.

Ellsworth, James P.; and Thomas, Glenn R., to Westinghouse Electric Corporation. Fused circuit interrupter. 3,588,772, Cl. 337-9.

Elmhurst, Richard F.: *See—*
Linardos, Stathis G.; Elmhurst, Richard F.; and Elmhurst, William A.,3,588,795.

Elmhurst, William A.: *See—*
Linardos, Stathis G.; Elmhurst, Richard F.; and Elmhurst, William A.,3,588,795.

Elmore, Austin E.; and Uhlmann, Ernest A. Thermo water dispensing fountain. 3,587,934, Cl. 222-181.

Elmore, Ernest L.: *See—*
Mills, Edwin R.; and Elmore, Ernest L.,3,588,446.
Mills, Edwin R.; and Elmore, Ernest L.,3,588,447.

Elox Inc.: *See—*
Sennowitz, Kurt H., 3,588,428.

Emerson, Lawrence W.: *See—*
Abramson, Paul; and Emerson, Lawrence W.,3,588,719.

Emhart Corporation: *See—*
Henry, James; and Burtis, Winfield R., 3,587,199.

Eminger, Robert J., to Fort Wayne Tool & Die, Inc. Electrical surge apparatus for compacting and forming dynamoelectric machine coils. 3,587,161, Cl. 29-205.

Enabnit, Robert S., to Goodyear Tire & Rubber Company, The. Debugging of on-line digital computers having an active interrupt. 3,588,835, Cl. 340-172.5

Enari, Shoji: *See—*
Miyamatsu, Yasunori; Hashimoto, Yuji; and Enari, Shoji,3,587,598.

Energy Conversion Devices, Inc.: *See—*
Fleming, Gordon R.; and Ovshinsky, Stanford R., 3,588,638.
Fleming, Gordon R.; and Ovshinsky, Stanford R., 3,588,639.

Engel, Edward W.: *See—*
Csaba, Elmer L.; and Engel, Edward W.,3,588,106.

Engel, Edward W., to SCM Corporation. Sheet feeding apparatus. 3,588,097, Cl. 271-61.

Engel Equipment, Inc.: *See—*
Smith, George B.; and Hirsch, John C., Jr., 3,587,273.

Engelhardt, Max; and Ziehm, Kurt F., Jr., to Xpress Automation, Inc., mesne. Method and apparatus for pulling extrusions from an extrusion press. 3,587,280, Cl. 72-257.

Engins Matra: *See—*
Szekely, Laszlo; Pigache, Claude; and Lafaye, Michel, 3,587,797.

English Electric Company Limited: *See—*
Antoszewski, Eugeniusz, 3,588,711.

Engrenages et Reducteurs (Engrenages Citroen et Ets Robert Messain reunes): *See—*
Henriot, Georges, 3,587,338.

Enis, Allan: *See—*
Saenger, John F., Jr.; Enis, Allan; and McGinty, Harry C.,3,588,464.

Ennulat, Dietrich F.: *See—*
Chen, Cheng-Lin; Zollweg, Robert J.; and Ennulat, Dietrich F.,3,588,573.

Enochian, Samuel H., to Unarco Industries, Inc. Lading panel with tine receiving elements. 3,587,480, Cl. 108-51.

Enoiu, Constantin; and Popa, Valeriu Serfiu, to Grupul Industrial Foraj Extractie Titeiu Moinesti Str. T. Vladimirescu. Reducer gear. 3,587,348, Cl. 74-797.

Enters, Edward W., to Gilson Bros. Co. Front hitch. 3,588,147, Cl. 280-481.

Eppard, Maurice William: *See—*
Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin,3,588,085.

Eprad Incorporated: *See—*
Boudouris, Angelo, 3,587,866.

Erickson, Harold E.: *See—*
Blickenderfer, Charles, Jr.; Erickson, Harold E.; and Clapp, Charles C.,3,587,153.

Erickson, Keith O., to Control Data Corporation. Dual source radiation bonding of plural joints. 3,588,425, Cl. 219-85.

Ericson, Lars Bert Ronald: *See—*
Peres, Axel Gote; and Ericson, Lars Bert Ronald,3,588,011.

Erlichman, Irving, to Polaroid Corporation. Photographic film assemblage. 3,587,426, Cl. 95-13.

Ernst, Richard R., to Varian Associates. Spectrometers using an R.F. noise generator employing a carrier modulated by a binary random sequency. 3,588,678, Cl. 324-0.5

Escallier, Edward Andrew; and Scully, Charles Norman, to North American Rockwell Corporation. Particle detection method and apparatus. 3,587,291, Cl. 73-12.

Escher Wyss G.m.b.H.: *See—*
Eisenmann, Wolfhart, 3,587,729.

Escher Wyss Limited: *See—*
Boelcs, Albin, 3,588,270.

Essex International, Inc.: *See—*
Alten, Ralph W., 3,588,765.

Esterline Corporation: *See—*
Haas, Ernest M., 3,588,767.

Estes, Harry Albert: *See—*
Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin,3,588,085.

Estes, Nelson N.: *See—*
Rudmose, H Wayne; and Estes, Nelson N.,3,588,358.

Etablissements Pompes Guinard, Societe Anonyme: *See—*
Guinard, Paul Andre, 3,588,124.

Ethicon, Inc.: *See—*
Kronenthal, Richard L., 3,587,586.

Evans, Elmer C.: *See—*
Wheelock, Richard A.; and Evans, Elmer C.,3,588,812.

Evans, Michael. Knee brace. 3,587,572, Cl. 128-80.

Evans Products Company: *See—*
Spaeth, Irvin J., 3,587,792.

Eversharp, Inc.: *See—*
Grosjean, Warren J., 3,588,467.

Evershed & Vignoles Limited: *See—*
Keefe, Arthur Thomas, 3,588,877.

EVG Entwicklungs- u. Verwertungsgesellschaft m.b.H.: *See—*
Gott, Hans; Ritter, Josef; and Ritter, Klaus, 3,588,417.

Ex-Cell-O Corporation: *See—*
Kellogg, Robert C.; and Martin, Philip C., 3,507,916.

Exline, Inc.: *See—*
Clements, Edward H., 3,587,228.

Ezekiel, Frederick D.: *See—*
Suter, Xaver; Schubert, Dale W.; and Ezekiel, Frederick D.,3,588,004.

Fabricated Metals, Inc.: *See—*
Coleman, Clarence B., 3,587,637.

Fabricius, John H., to Sprague Electric Company. High capacitance variable capacitor. 3,588,640, Cl. 317-249.

Fabricius, John H., to Sprague Electric Company. Rotary variable capacitor. 3,588,641, Cl. 317-249.

Fabricius, John H.; and Maher, John P., to Sprague Electric Company. Variable electronic component. 3,588,642, Cl. 317-249.

Fairbanks Morse Inc.: *See—*
Henderson, Robert M.; Miller, Lowell E.; and Zechlin, Richard, 3,588,479.
Unger, Peter I.; and Bright, Edward D., 3,588,480.
Zechlin, Richard, 3,587,550.

Fairchild, H. Bradley. Coconut treating apparatus for process. 3,587,696, Cl. 146-222.

Fairchild Hiller Corporation: *See—*
Howard, Derek, 3,587,246.

Fallenius, Kai B.; and Varmola, Keijo A., to Outokumpu Oy. Device for detecting non-magnetic or magnetic conducting bodies for conveyors using coils whose projection on the conveyors are essentially trapezoidal. 3,588,685, Cl. 324-41.

Fan Clutch Inc.: *See—*
Crawford, Bobby D., 3,587,800.

Fapiano, Donald J., to General Electric Company. Method and apparatus for estimating workpiece gage in a reducing mill. 3,587,264, Cl. 72-8.

Farah Manufacturing Company, Inc.: *See—*
Beazley, Aubrey G., 3,587,497.

Farbenfabriken Bayer Aktiengesellschaft: *See—*
Kampf, Gunther; Vinzelberg, Bernhard; and Walz, Helmut, 3,588,429.

Farrer, Sydney; and Doe, Ernest Edward, to Bryan Donkin Company Limited, The. Gas pressure regulators. 3,587,628, Cl. 137-456.

Farstad, Virgil L.: *See—*
Schoenwald, Waldo W.; and Farstad, Virgil L.,3,588,100.

Fashioncraft-Excello: *See—*
Berry, Morris J.; and Wells, Louis, 3,587,795.

Faure, Marc Henri Jean, to Societe d'Etudes et de Development des Aeroglisseurs Marins Terresters et Amphibies S.E.D.A. Ground-effect machines propelled by air or gas streams. 3,587,771, Cl. 180-120.

Feagin, Roy C., to Howmet Corporation. Ceramic gang mold. 3,587,721, Cl. 164-350.

Fedders Corporation: *See—*
Harlow, Willis Edward, 3,588,018.
Korenz, Edward, 3,588,151.

Federal Pacific Electric Company: *See—*
Caveney, Frank, 3,588,774.

Feier, Kurt; and Werthmuller, Hans, to Fritz Buser AG, Maschinenfabrik. Rolling contact screen printing machine with deformable counterpressure member. 3,587,458, Cl. 101-114.

Feinman, Jerome. Apparatus for controlled cooling of metal samples. 3,588,065, Cl. 266-5.

Feland, Ovalt A. Culvert bevelled end construction with heavy grating. 3,587,239, Cl. 61-16.

Felcheck, Marvin, to AMF-Incorporated. Business event display device. 3,588,838, Cl. 340-172.5

Fellinger, Frank, to GTE Automatic Electric Laboratories Incorporated. Memory sensing circuit including a combined adder and amplifier stage. 3,588,532, Cl. 307-233.

Fenwick, Jay G., to Streater Industries, Inc. Base nose hook lock for display stands. 3,587,867, Cl. 211-183.

Fergestad, Ragnvald: *See—*
Kilgore, Lee A.; Fergestad, Ragnvald; and Schanche, Tor,3,588,557.

Ferguson, Clarence R.; and Periman, Rubie E. Saw set. 3,587,356, Cl. 76-64.

Ferko, Alexander, to Gulf & Western Industrial Products Company, mesne. Conveying apparatus. 3,587,828, Cl. 198-108.

Fernseh G.m. b. H.: *See—*
Krause, Gerhard, 3,588,323.

Ferris, Ray L.; Shaver, William R.; and Dohne, Jan W., to Pullman Incorporated. Railroad car door means. 3,587,477, Cl. 105-378.

Fessenden, De Witt M. Pressurized fuel metering device. 3,587,546, Cl. 123-139.

Feucht, Jacob E., to Westinghouse Air Brake Company. Rock drill with overriding clutch. 3,587,753, Cl. 173-107.

Fibreboard Corporation: *See—*
Theys, Ezra E.; and Morse, Hugh B., 3,587,411.

Fiddler, Theodore E. Actuator cable adjustment device. 3,587,341, Cl. 74-501.

Field, Louis, to Allied Tank Truck Equipment Company. Vehicle construction. 3,588,137, Cl. 280-5.

Fieldcrest Mills, Inc.: *See—*
Mills, Edwin R.; and Elmore, Ernest L., 3,588,446.
Mills, Edwin R.; and Elmore, Ernest L., 3,588,447.

Figueroa, John W.; Morgan, William J.; and Rasmussen, Rolland R., to Honeywell Information Systems Inc., mesne. Input/out controller for independently supervising a plurality of operations in response to a single command. 3,588,831, Cl. 340-172.5

Firth, Donald; and Cunningham, Sinclair Upton, to National Research Development Corporation. Triple ball motor spindle drive. 3,587,400, Cl. 91-492.

Fischbach, Alfred. Method and apparatus for maintaining pressure at a hydraulic accumulator. 3,587,233, Cl. 60-51.

Fischer, Pius: *See—*
Muller, Walter; and Fischer, Pius,3,588,194.

Fishe, Gerald R. A.: *See—*
McEwen, Norman S.; and Fishe, Gerald R. A.,3,587,437.

Fisher, Don E.; and Osban, William R. Traverse guide assembly. 3,587,989, Cl. 242-18.

Fisher, George A.; and Stearns, Charles F., to United Aircraft Corporation. Sequencing mechanism for a fuel control. 3,587,231, Cl. 60-39.28

Fisons Limited: *See—*
Ross, Alexander Allan, 3,587,971.

Fitch, James B., to Nash Engineering Company. Vacuum pump or compressor. 3,588,283, Cl. 417-68.

Fites, Larry L.; and Truckenmiller, Major C., to Upjohn Company, The. Dispenser. 3,587,517, Cl. 116-121.

Fitzgerald, Lynn: *See—*
Wienert, Lloyd C.; Fitzgerald, Lynn; Sturges, Hiram A.; and Johnson, Henry T.,3,587,529.

Fjallbrant, Tore Torstensson; and Hagerlof, Bernt Ingvar, to Telefonaktiebolaget L M Ericsson. Variable frequency transistor R-C feedback oscillator. 3,588,743, Cl. 331-108.

Flack, John Gene. Inhalation device with repturable microscopic capsules. 3,587,573, Cl. 128-201.

Flanagan, Robert M., to Amerace Esna Corporation. Pavement marker and mounting base member. 3,587,416, Cl. 94-1.5

Flanagan, Thomas L., to Wagner Research Corporation. Continuous flow folding device with storage and retrieval system for producing various sizes of folds. 3,588,089, Cl. 270-93.

Fleckenstein, Lambert W. Timing means for providing timed output signals. 3,587,329, Cl. 74-3.54

Fleischer, Leo, to Crystal Tissue Company. Variegated tissue paper coloring apparatus. 3,587,525, Cl. 118-115.

Fleming, Gordon R.; and Ovshinsky, Stanford R., to Energy Conversion Devices, Inc.Current controlling device including VO_2. 3,588,638, Cl. 317-238.

Fleming, Gordon R.; and Ovshinsky, Stanford R., to Energy Conversion Devices, Inc.Current controlling device including a VO_2 film. 3,588,639, Cl. 317-238.

Fleming, Robert F., Jr.; and Riggs, Robert F., to Sperry Rand Corporation. Ship's warning system. 3,588,803, Cl. 340-16.

Flexigrip, Inc.: *See—*
Staller, Karel J., 3,587,657.

Flint, John Christopher Eglington, to Dowty Technical Developments Limited. Variable displacement pumps. 3,587,636, Cl. 137-565.

Flitsch, Ernst, Firma: *See—*
Gotzenberger, Rudibert, 3,587,642.

Flodin, Carl T., to Bigelow-Garvey Lumber Co. Collapsible materials handling container. 3,587,901, Cl. 217-16.

Flodin, Carl T., to Bibelow-Garvey Lumber Co. Collapsible re-usable container. 3,587,902, Cl. 217-16.

Florence, Judit K.: *See—*
Dell, Harold R.; and Florence, Judit K.,3,588,847.

Florin, Hans: *See—*
Menke, Helmut; and Florin, Hans,3,587,467.

Flower, John Walter, to National Research Development Corporation. Undesirable yawing moment correcting means for gas-cushion vehicles. 3,587,770, Cl. 180-117.

Fluhr, Ferderick R., to United States of America, Navy. Linear phase demoduator. 3,588,720, Cl. 329-124.

Foley, James J., to Whittaker Corporation. Means and method for sensing chair layers. 3,587,299, Cl. 73-67.7

Folson, Theodore R.; Weitz, William E., Jr.; and Tennant, David A., to United States of America, Navy, mesne. Flame photometric method and apparatus for quantitatively analyzing material specimens. 3,588,257, Cl. 356-187.

Fono, Peter, to North American Rockwell Corporation. Inductor generator structure. 3,588,559, Cl. 310-160.

Ford, Duane B.; and Walker, Grant W. Liquid filled shock absorbing modular buffer. 3,588,158, Cl. 293-1.

Ford, Duane B.: *See—*
Duckett, John W.; Walker, Grant W.; and Ford, Duane B.,3,588,159.

Ford Motor Company: *See—*
Jaklevic, Robert C.; and Lambe, John J., 3,588,637.

Formaster Limited: *See—*
Glover, William, 3,587,959.

Formenti, Ferdinando; and Valbonesi, Giuseppe, to Societa Italiana Telecommunicazioni Siemens. Signaling circuitry for time-sharing telecommunication system. 3,588,366, Cl. 179-15.

Forni, Luigi: *See—*
Pigni, Umberto; and Forni, Luigi,3,587,277.

Forster, Friedrich M. O. System for inspecting a welded seam with means for generating a signal which is a function of the welding temperature. 3,588,682, Cl. 324-37.

Forster, Klaus W.: *See—*
Mc Cready, Ross B.; and Forster, Klaus W.,3,588,073.

Forster, Klaus W.; and Schaper, Donald W., to Kerma Corporation. Apparatus for charging a furnace. 3,587,880, Cl. 214-19.

Fort, Jacob Robert, to Globe Universal Sciences, Inc. Telemetering system for use in boreholes. 3,588,804, Cl. 340-18.

Fort Wayne Tool & Die, Inc.: *See—*
Eminger, Robert J., 3,587,161.

Fortescue, Thomas Richard: *See—*
Quereshi, Umar; and Fortescue, Thomas Richard,3,588,884.

Fortier, Andre. Differential fluidic logic cell. 3,587,608, Cl. 137-81.5

Foster, Donald L.; and Williams, Lenord, to Space/Defense Corporation. Gaseous atmosphere control device. 3,587,438, Cl. 98-1.5

Foster-Miller Associates: *See—*
Verplank, William L., 3,587,605.

Fowler, John H.; and Herd, David P., to Rockwell Manufacturing Company. Seal. 3,588,130, Cl. 277-116.8

Franc, Charles. Illumination unit. 3,588,491, Cl. 240-6.4

Francis, Samuel A., to Buzzards Corporation, The. Underwater data acquisition device. 3,588,794, Cl. 340-3.

Frantz, Franklin D.: *See—*
Ross, Sidney D.; and Frantz, Franklin D.,3,588,643.

Fraser, Douglas: *See—*
Bender, Charles E.; Thompson, Taylor N.; and Fraser, Douglas,3,587,899.

Frassoldati, Gian Carlo. Cocktail accessory. 3,588,275, Cl. 416-71.

Frazier, William R., Jr., to General Dynamics Corporation. Magnetic recording. 3,588,836, Cl. 340-174.1

Fredell, Gary D., to Gulf & Western Industries, Inc., mesne. Rotary stepping programmer with improved camming means. 3,588,396, Cl. 200-38.

Frederick, Oscar C.: *See—*
Bailey, Cecil; and Frederick, Oscar C.,3,588,405.
Bailey, Cecil; and Frederick, Oscar C.,3,588,433.

Freed, Donald L., Jr., to National Mine Service Company. Spooling device. 3,587,994, Cl. 242-158.3

Freier, Gerald H.; and Zanders, Charles E., to V-M Corporation. Record changer spindle. 3,588,121, Cl. 274-10.

Frenken, Klaus: *See—*
Schrewe, Hans; Kobusch, Helmut; Liestmann, Wolf-Dietrich; Carius, Wolfhard; Vom Ende, Hans; Frenken, Klaus; and Vogt, Gerd,3,587,719.

Fresard, Marcel; and Plomb, Francis, to Mefina S.A. Sewing machine casing. 3,587,500, Cl. 112-258.

Freses, Fredesvindo. Toilet seat cover. 3,587,119, Cl. 4-242.

Fresia, Elmo James: *See—*
Miller, David S.; Fresia, Elmo James; and Cooper, Alan G.,3,588,631.

Freund, Artice M.; Raad, Laura A.; and Johnson, Wendell J. Rotating photographic enlarging easel for making multiple or single exposures. 3,588,248, Cl. 355-74.

Fricke, Louis H., Jr.; and Walsh, Robert A., to Monsanto Company. Function generator for producing a triangular wave form having only positive peak values. 3,588,487, Cl. 235-197.

Friday, David G.: *See—*
Friday, Philip L.; and Friday, David G.,3,587,882.

Friday, Philip L.; and Friday, David G. Lifting and transporting apparatus. 3,587,882, Cl. 214-75.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
Heinrich, Helmut Ernst Adolf, 3,587,983.
Ziehm, Gunter Hans; and Triebold, Karl-Friedrich, 3,588,797.

Fried. Krupp G.m.b.H.: *See—*
Kracht, Robert, 3,587,278.

Friedman, Joel S., to Beede Electrical Instrument Co., Inc. Meter relay having concentric controls and meter reading sensors. 3,588,516, Cl. 250-231.

Friedsam, Joseph: *See—*
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Wasser, Willi; Browatzki, Kurt; Friedsam, Joseph; and Heidenreich, Max,3,587,962.

Friley, James W.: *See—*
Dowdall, Donald H.; Friley, James W.; and Sophy, Daniel A.,3,587,162.

Frink, Russell E.; and Milianowicz, Stanislaw A., to Westinghouse Electric Corporation. Puffer piston gas blast circuit interrupter with insulating nozzle member and valve acting hollow contacts. 3,588,407, Cl. 200-148.

Fritsch, Rezso. Press brake. 3,587,286, Cl. 72-389.

Fritz Buser AG, Maschinenfabrik: *See—*
Feier, Kurt; and Werthmuller, Hans, 3,587,458.

Froehlig, Rudolph A., to Modern Album and Finishing Co., Inc. Package construction and method of making. 3,587,848, Cl. 206-78.

Frohbach, Hugh F., to RCA Corporation. Lens array imaging system for a color encoding camera. 3,588,326, Cl. 178-5.4

Froitzheim, Hans; Letzel, Karl; and Bsirske, Leo, to Daimler-Benz Aktiengesellschaft. Sleeping place arrangement for trucks. 3,588,168, Cl. 296-28.

Frost, C. L., & Son, Inc.: *See—*
Frost, Ruben E., 3,588,206.

Frost, Ruben E., to Frost, C. L., & Son, Inc. Bearing construction. 3,588,206, Cl. 308-187.1

Fruit Harvesting Co., Inc.: *See—*
Adrian, Philip R., 3,587,884.

Fuchs, Franz, to Rohrs, Werner, K.G., Dr. Dragline winch for ski tows and the like. 3,587,474, Cl. 104-173.

Fudge, William L.; and Klein, Lloyd L., to Larsen's Manufacturing Company. Fire extinguisher cabinet. 3,587,913, Cl. 220-55.

Fuji, Takashi; and Sato, Matsuo, to Nippon Kokan Kabushiki Kaisha. Back reflection block for ultrasonic flaw detection. 3,587,300, Cl. 73-67.7

Fujimura, Yasushi: *See—*
Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi,3,588,243.

Fujita, Saburo: *See—*
Sugiura, Hiroshi; Tsuge, Sakae; Hosaka, Izumi; Kusunoki, Kunio; and Fujita, Saburo,3,587,803.

Fujitsu Limited: *See—*
Nakayama, Norihiko; Tanaka, Minoru; and Miyauchi, Eizo, 3,588,600.
Oiso, Mitsuo, 3,588,718.
Uozumi, Tadashi, 3,588,712.

Fukushima, Yoshio, to Kabushiki Kaisha Ricoh. Multiphotographic device. 3,587,430, Cl. 95-37.

Fulchiron, Jean, to Institut de Recherches de la Siderurgie Francaise. Apparatus for conveying and distributing particulate material. 3,588,178, Cl. 302-28.

Fuller, Eugene M. Goal for a basketball game. 3,588,103, Cl. 273-1.5

Furfaro, Blase J.; and Wilhelm, Donald F., to Helm Instrument Company, Inc. Condition monitoring apparatus. 3,588,695, Cl. 324-111.

Furlong, Thad E. Electric tire inflation indicator. 3,588,814, Cl. 340-58.

Furukawa, Teruo, to Caterpillar Mitsubishi Ltd. Track bushing wear reducing device. 3,588,195, Cl. 305-57.

Fuse Indicator Corporation: *See—*
Poehlman, Edmund F., Jr., 3,588,775.

Fussner, Paul; Hirsch, Gunter; and Vogt, Dieter, to Bosch, Robert, G.m.b.H. Fuel injection nozzle. 3,587,977, Cl. 239-533.

Gabler, Josef L. Housing for accomodating a stick of cosmetic material for example a lipstick. 3,588,262, Cl. 401-59.

Gabor, Joseph: *See—*
Ries, Herman E., Jr.; and Gabor, Joseph,3,587,860.

Gabor, William D., to Sanders Associates, Inc. Character encoder. 3,588,875, Cl. 340-347.

Gadd, John Horace; Hadekel, Ruben; and Sumins, Edmund Joseph, to Trico Products Corporation. Fluid-pressure-operated motors. 3,587,396, Cl. 91-239.

Gaetano, Anthony J.: *See—*
Weaver, Rufus J.; and Gaetano, Anthony J.,3,588,046.

Gagen, Charles V.: *See—*
Goff, Raymon L.; and Gagen, Charles V.,3,587,235.

Gager, Robert M., to Picker Corporation, mesne. X-ray tube protective circuit including thermionic discharge means connected in series with the X-ray tube. 3,588,510, Cl. 250-103.

Gagliardi, Paul. Device for degassing liquids. 3,587,211, Cl. 55-199.

Gailitis, Adolph R., to Gillette Company, The. Pressurized dispensing package. 3,587,942, Cl. 222-402.24

Gaines, Jack H., to Sierra Electric, Inc. Illuminated electrical device. 3,588,489, Cl. 240-2.

Galster, Thomas H.; and Hess, Thomas W., to Xerox Corporation. Logic control apparatus. 3,588,472, Cl. 235-92.

Gamache, Robert W.: *See—*
Parkinson, James R.; and Gamache, Robert W.,3,587,305.

Gamaunt, Roger L., to Lockheed Aircraft Corporation. Steering assembly for a vehicle. 3,587,767, Cl. 180-79.2

Gamberini, Ernesto. Machine for dispensing predetermined amounts of powdered or granular produce in containers by means of volumetric dispensers. 3,587,671, Cl. 141-67.

Gamble, Ralph S.: *See—*
Lobdell, Stephen L.; and Gamble, Ralph S.,3,587,322.

Gambs, Paul Frederic. Optical device for moving a luminous target across the eyes. 3,588,234, Cl. 351-13.

Game-Time, Inc.: *See—*
Wormser, Robert S., 3,588,021.

Gannaway, Edwin L.; and Draper, Robert M., to Copeland Refrigeration Corporation. Compressor. 3,587,406, Cl. 92-74.

Gano, John W.; and Kline, Lester H., to Warner & Swasey Company, The. Boom assembly. 3,587,886, Cl. 214-141.

Ganter, Wolfgang; and Von Zeppelin, Kurt. Timepiece having a setting device arranged coaxially with the hands arbors. 3,587,224, Cl. 58-34.

Garabedian, Joseph; and Garabedian, Mike, to Valley Welding & Machine Works, a partnership. Article pick-up machine. 3,587,814, Cl. 198-7.

Garabedian, Mike: *See—*
Garabedian, Joseph; and Garabedian, Mike,3,587,814.

Gardner, Leonal P., to Herfy's Corporation. Hamburger bun toasting equipment. 3,587,446, Cl. 99-339.

Garot, L. F.: *See—*
Laatsch, Walter R., 3,587,754.

Garrett Corporation, The: *See—*
Hickling, Colin D., 3,588,745.

Garwin, Edward L.: *See—*
Rabinowitz, Mario; and Garwin, Edward L.,3,588,593.

Gates Radio Company: *See—*
Swanson, Hilmer I., 3,588,744.

Gaulke, Wallace E. System for supervision of operation of a machine. 3,588,864, Cl. 340-267.

Gavagan, Robert J.: *See—*
Bognar, Frank J.; and Gavagan, Robert J.,3,588,156.

Gaylord, John A., to Koch, H., & Sons, Inc. Web adjuster. 3,587,140, Cl. 24-194.

Gazzo, Joseph F. Plural signal vehicle light signalling system. 3,588,817, Cl. 340-87.

Geary, William Richard Clifford. Roll forming fodder harvesters. 3,587,218, Cl. 56-343.

Gebr. Bohler & Co. Aktiengesellschaft: *See—*
Holzgruber, Wolfgang; and Kleinhagauer, Otmar, 3,587,715.

Geci, Melan: *See—*
Edwards, Joseph Arthur, Jr.; Bishop, Vernon; Geci, Melan; and Campbell, Dudley H.,3,588,778.
Geffe, Philip R., to Westinghouse Electric Corporation. Q-invariant active resonator. 3,588,725, Cl. 330-21.
Gehri, Aime Albert. Dice breaker. 3,587,955, Cl. 225-103.
Geiger, Bernard: *See—*
Juillard, Yves; and Geiger, Bernard,3,587,663.
General Dynamics Corporation: *See—*
Bowling, John C., 3,588,348.
Frazier, William R., Jr., 3,588,836.
Utterback, Max G., 3,587,519.
General Electric Company: *See—*
Bailey, Cecil; and Frederick, Oscar C., 3,588,405.
Bailey, Cecil; and Frederick, Oscar C., 3,588,433.
Barkan, Philip; and Kotos, Peter, 3,588,520.
Bauer, Douglas M.; and Nagel, Martin J., 3,588,856.
Boothe, Willis A., 3,587,616.
Dahlstrom, Finn, 3,588,562.
Doherty, Martin C., 3,587,611.
Egan, William E., 3,588,655.
Fapiano, Donald J., 3,587,264.
Hampton, Thomas L., 3,588,268.
Heft, Eldon B.; and Klein, Keith W., 3,588,761.
Heft, Eldon B., 3,588,763.
Henderson, Wayne L.; and Dills, Raymond L., 3,587,557.
Hoffmeyer, William R.; and Rediger, Alvin L., 3,588,561.
Howald, Werner E.; and Wright, Jack D., 3,588,277.
Howard, Norman C.; and Wilkinson, Lawrence E., 3,588,031.
Jordan, J Paul, Jr.; and Leightner, Robert A., 3,588,529.
Kingsbury, L. C. James; and Petrie, Adelore F., 3,588,122.
Levand, Victor A., Jr.; Thomasson, Gene I.; and Holcomb, Richard H., 3,588,315.
Maier, Cletus E., 3,587,147.
McVey, Charles I.; and Louden, William C., 3,588,577.
Omohundro, William A., 3,588,444.
Rhoades, John M., 3,588,254.
Ritchie, Henry B., 3,588,037.
Rogers, George L., 3,588,659.
Rusho, Frank W., 3,588,747.
Snowman, Lawrence R., 3,588,496.
Urbanosky, Thomas F., 3,587,602.
Wasileski, Norbert J., 3,588,620.
Wellford, Armistead L.; and Culler, John H., 3,588,669.
Willard, Henry G., 3,588,762.
Wolf, Jeremiah P.; Sutherland, William V.; and Dusa, Donald J., 3,587,973.
General Electric Corporation: *See—*
Sandor, Bela, 3,587,259.
General Motors Corporation: *See—*
Arnold, Gunther, 3,587,249.
Ballou, Richard P., 3,587,545.
Cox, Ronald W.; and Anderson, Arthur L., 3,588,890.
Creed, John W., Jr.; and Paffrath, Edgar C., 3,587,612.
Harris, John R.; and Rigsby, Gerald E., 3,588,591.
Harter, Robert M., 3,588,036.
Jacobs, James W., 3,587,245.
Keller, Robert C.; and Walters, Leslie K., 3,587,351.
McIntosh, Duane E., 3,588,714.
Pollock, Samuel C., 3,588,492.
Riner, Robert J.., 3,587,801.
Schaefer, Robert H., 3,587,355.
Schultze, Harold E., 3,587,790.
Umanos, Romeo O., 3,587,248.
Wall, Earle R., Jr., 3,588,269.
Walters, Leslie K.; and Hartman, Lee E., 3,587,783.
Wanlass, Bert R., 3,587,350.
General Precision Systems Inc.: *See—*
Riordan, Hugh E.; Parker, Bernard; and Weisbord, Leon, 3,587,326.
General Signal Corporation: *See—*
Barker, William M., 3,588,824.
Shook, Carl G.; Anderson, Robert F.; and Macano, Samuel J., 3,588,825.
General Telephone & Electronics Laboratories, Incorporated: *See—*
Chan, Joseph Y.; and Gupta, Dinesh C., 3,588,541.
General Time Corporation: *See—*
Schneider, Quentin L., 3,588,621.
George, William W. Clinching apparatus. 3,587,204, Cl. 53-138.
Gerain, Jean R.: *See—*
Dugeny, Pierre L.; Gerain, Jean R.; Quinaud, Michel C.; and Zangheri, Daniel C.,3,587,813.
Gerb, Joachim, to Arnold & Richter KG. Film feed machanism. 3,587,960, Cl. 226-62.
Gerber Scientific Instrument Company, The: *See—*
Logan, David Jopson; Webster, Ronald B.; Pavone, Robert Joseph; and Richardson, David Gilmer, Jr., 3,588,081.
Gerritsen, Hendrik J.: *See—*
Heller, Macy E.; and Gerritsen, Hendrik J.,3,588,439.
Gersch, Richard G.; and Hoag, Kip J., to McGraw-Edison Company. Decorative overwrap cabinet structure. 3,588,212, Cl. 312-204.
Gersman, Jerome, to United States of America, Navy. Optically alignable bench mark. 3,588,025, Cl. 248-481.
Gerwick, Fred W.; and Block, Harold C., deceased0 (by Block, Margaret D.; executrix), to Layne & Bowler Company, The, mesne. Apparatus for use in deviated wells. 3,587,740, Cl. 166-278.
Geschwender, Robert C. Cellular structural products. 3,587,479, Cl. 108-51.
Geschwender, Robert C. Apparatus for applying adhesive to spaced areas. 3,587,526, Cl. 118-211.
Gessner, Gunter J.; and Vargo, Donald P., to Bendix Corporation, The. Fail safe monitor. 3,588,857, Cl. 340-213.
Gestetner Limited: *See—*
Spencer, Alexander; Blake, Alan Francis; and Burns, David Guthrie, 3,587,459.
Gewerkachaft Eisenhutte Westfalis: *See—*
Temme, Helmut, 3,587,831.
Giangarra, Anthony; and Cybulsky, Kenneth J., to Becton, Dickinson and Company. Micropipette dispenser. 3,587,921, Cl. 221-174.
Giardina, Jacob A.: *See—*
Willett, Harold A.; and Giardina, Jacob A.,3,587,214.
Giblin, James P.: *See—*
Bernier, Louis E.; and Giblin, James P.,3,587,181.
Giesfeldt, William Ott; and Pinnow, Roy Lee, to Globe-Union Inc. Ohmic contact and method and composition for forming same. 3,588,636, Cl. 317-238.
Gifford, George M.: *See—*
Grafton, Donald L.; and Gifford, George M.,3,588,523.
Gifford, Lawrence F. Exercise bar. 3,588,102, Cl. 272-81.
Gifford, Oscar D. Power mower clipping-collecting attachment- collecting trailer therefor. 3,588,179, Cl. 302-37.
Gifford-Hill-Western, Inc.: *See—*
Johnson, James Burl, Jr.; Hammond, Malcolm Perry; and Starnes, Billy Wayne, 3,588,182.
Gilbert, Jack J., to Spyro Dynamics Corporation. Right angle drive. 3,587,339, Cl. 74-416.
Gilbert, Richard Lapham, Jr.; and Knapp, Paul William, to American Cyanamid Company. Method for determining susceptibility of urea to caking on an accelerated basis. 3,587,292, Cl. 73-15.4
Gillette Company, The: *See—*
Gailitis, Adolph R., 3,587,942.
Nissen, Warren I., 3,587,174.
Perry, Roger L., 3,587,171.
Gilmore, Samuel E. Adjustable toggle float valve. 3,587,627, Cl. 137-445.
Gilmore, Thomas P., to Allis-Chalmers Manufacturing Company. System for controlling magnitude and phase of terminal voltage for adjustable speed synchronous motor. 3,588,645, Cl. 318-142.
Gilson Bros. Co.: *See—*
Enters, Edward W., 3,588,147.
Giltner, Charles M., to Ametek, Inc. Self-erecting spiral tube device. 3,587,658, Cl. 138-154.
Girola, Angelo. Hydraulic master. 3,588,032, Cl. 251-3.
Giudici, Raymond B. Air filtering device for buses and the like. 3,587,440, Cl. 98-2.
G.K.N. Engineering Limited: *See—*
Sharman, John C., 3,587,288.
Glance, Bernard, to Bell Telephone Laboratories, Incorporated. Microstrip semiconductor mount with composite ground plane. 3,588,741, Cl. 331-96.
Glassman, Jacob A. Biopsy instrument and method of obtaining biopsy. 3,587,560, Cl. 128-2.
Glazer, Sydney: *See—*
Congleton, David B.; Glazer, Sydney; and Armstrong, Melvin S.,3,588,818.
Glidden Electric Corporation, The: *See—*
Glidden, Roger C., 3,588,482.
Glidden, Roger C., to Glidden Electric Corporation, The. Decimal to binary converter. 3,588,482, Cl. 235-155.
Globe Universal Sciences, Inc.: *See—*
Fort, Jacob Robert, 3,588,804.
Globe-Union Inc.: *See—*
Giesfeldt, William Ott; and Pinnow, Roy Lee, 3,588,636.
Goerg, Charles Richard, 3,588,779.
Glover, William, to Formaster Limited. Web feeding devices. 3,587,959, Cl. 226-43.
Godel, Siegfried; and Miller, Lester F., to Sperry Rand Corporation. Drip type coffee maker. 3,587,444, Cl. 99-282.
Godley, William P.: *See—*
Dietrich, Michele; and Godley, William P.,3,587,188.
Goerg, Charles Richard, to Globe-Union Inc. Linear motion variable resistance control. 3,588,779, Cl. 338-183.
Goff, Raymon L.; and Gagen, Charles V., to TRW Inc. Regenerative hydrostatic steering system. 3,587,235, Cl. 60-52.
Goggins, William B., Jr.; and Poirier, Joseph L., to United States of America, Air Force. Synthetic aperture analysis radar. 3,588,895, Cl. 343-5.
Gold, Harold; and Macks, Fred. Thread locking means. 3,587,701, Cl. 151-21.
Gold, Milton O.: *See—*
Lingmann, Orson R.; and Gold, Milton O.,3,588,686.
Goldkuhle, Werner Peter: *See—*
Hemphill, Charles Wayne; and Goldkuhle, Werner Peter,3,587,448.
Golobart, Ramon Balaguer. Method for producing woven fabrics with stationary weft tapes. 3,587,661, Cl. 139-122.

Gonzalez, Ricardo, to Omark Industries, Inc. Method of forming welding studs from sheet-like material. 3,587,285, Cl. 72-379.
Good, Elmer H.: *See—*
Harris, George W.; and Good, Elmer H.,3,587,904.
Good, Paul J., to Minnesota Mining and Manufacturing Company. Roll film processor and processing method. 3,587,428, Cl. 95-94.
Goode, James K., Jr.: *See—*
Keck, Robert H.; and Goode, James K., Jr.,3,587,842.
Goodwin, Francis E., to Hughes Aircraft Company. Frequency stabilized laser. 3,588,738, Cl. 331-94.5
Goodyear Aerospace Corporation: *See—*
Hampton, William, 3,588,903.
Goodyear Tire & Rubber Company, The: *See—*
Enabnit, Robert S., 3,588,835.
Ruof, Edgar J., 3,587,317.
Gordon, Bernard M., to Gordon Engineering Company. Cyclic device for analog to digital conversion. 3,588,881, Cl. 340-347.
Gordon Engineering Company: *See—*
Gordon, Bernard M., 3,588,881.
Schreuer, Walter; Neumann, Leopold; and Rigby, Sherman, 3,588,730.
Gorman, John F. Vehicle safety device. 3,588,142, Cl. 280-150.
Gormley, John B. Lifting, supporting and moving device. 3,588,047, Cl. 254-93.
Gott, Hans; Ritter, Josef; and Ritter, Klaus, to EVG Entwicklungs- u. Verwertungsgesellschaft m.b.H. Wire mesh welding machine. 3,588,417, Cl. 219-56.
Gotze, Gotthold: *See—*
Wehr, Georg; Gotze, Gotthold; and Heesch, Hans,3,587,681.
Gotzenbergcr, Rudibert, to Flitsch, Ernst, Firma. Expansion valve. 3,587,642, Cl. 137-614.21
Gouye, Emmanuel V.: *See—*
Reinfeld, Kurt; and Gouye, Emmanuel V.,3,588,066.
Grace, Charles H.: *See—*
Kolb, Edwin R.; and Grace, Charles H.,3,588,872.
Grace, W. R., & Co.: *See—*
Addy, William D.; and Wessells, Forrest A., 3,588,079.
Deakin, Gordon Asquith; Eastwood, Alan; and Vinnicombe, Gordon, 3,587,819.
Rosati, James J.; and Boulton, Richard C., 3,587,821.
Taylor, Monroe F., 3,587,958.
Wessels, Forrest Ashton, 3,587,464.
Wing, Ralph L., 3,587,843.
Wing, Ralph L., 3,587,844.
Wing, Ralph L., 3,587,845.
Grado, Gilbert R. Rate resolver which accepts an angular rate input and produces a sinusoidal output. 3,588,485, Cl. 235-186.
Graf, Edwin H. Boat-supporting and launching device. 3,587,874, Cl. 214-1.
Graf, Peter. Curtain guide rail assembly. 3,587,131, Cl. 16-95.
Graff, George Michael. Safety closure having locking ring. 3,587,896, Cl. 215-9.
Grafton, Donald L.; and Gifford, George M., to United Aircraft Corporation. Regulated series to multiple power converter. 3,588,523, Cl. 307-132.
Granger Associates: *See—*
Broyles, Harry C., 3,588,904.
Granger, Wallace H. Simplified circulating inking system for rotary newspaper printing press. 3,587,463, Cl. 101-350.
Granito, Gerry D.: *See—*
Boland, Lawrence J.; and Granito, Gerry D.,3,588,829.
Grant, Samuel E.: *See—*
Bush, Thomas P., Jr.; and Grant, Samuel E.,3,587,684.
Graser, Earl J., to Olinkraft, Inc. Single-ply crown support carrier. 3,587,847, Cl. 206-65.
Gratton, Peter D.; and Ayres, James N., to United States of America, Navy. Centrifugally armed ordnance fuze. 3,587,469, Cl. 102-79.
Gray, G. A., Company: *See—*
Kreimer, Alfred, 3,587,389.
Greby, Daniel F., to Industrial Tectonics, Inc. Rolling element retainer having element retaining tabs. 3,588,207, Cl. 308-201.
Green Bay Research Corporation: *See—*
Miles, Cecil W., 3,587,542.
Miles, Cecil W., 3,587,544.
Greenberg, Burton: *See—*
Murgas, Karl M.; Greenberg, Burton; and Clark, Otto A.,3,588,244.
Greenberg, Irving Melbourne. Surgical sponge with magnetized means. 3,587,583, Cl. 128-296.
Greenblum, Carl, to Bunker-Ramo Corporation, The. Pulse delay circuit. 3,588,547, Cl. 307-293.
Greenfield, George B. Radiographic image subtraction technique. 3,588,502, Cl. 250-65.
Greeno, John S., to Leggett and Platt Inc. Spring frame assembly. 3,587,120, Cl. 5-260.
Greer Hydraulics, Inc.: *See—*
Jacobellis, Alphonse A.; and Zahid, Abduz, 3,587,653.
Gref, Hans: *See—*
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Wasser, Willi; Browatzki, Kurt; Friedsam, Joseph; and Heidenreich, Max,3,587,962.
Gregerson, Stanley Martin: *See—*
Parquet, Donald James; Hall, Daniel Luce; and Gregerson, Stanley Martin,3,587,399.
Grether, Tobias; and Donlon, Roger M., to Hi-Gear Harvester Company. Celery harvester. 3,587,216, Cl. 56-327.
Grieb, Geoffrey E.; and Cardozo, Danforth, Jr., to Concord Fabrics, Inc. Pan carrier assembly for fabric samples. 3,587,793, Cl. 190-16.
Griffin, Billy J. Baseball batting training device. 3,588,104, Cl. 273-26.
Griffin, Hugh Allen, to United States of America, Navy. Test circuit including bridge type oscillator means for monitoring equivalent series resistance of quartz crystals. 3,588,690, Cl. 324-56.
Griffin, James Thomas: *See—*
Eckl, James J.; and Griffin, James Thomas,3,588,435.
Griffith, Edward G., to Kearney & Trecker Corporation. Tool selector with magazine. 3,587,165, Cl. 29-568.
Griffiths Electronics Inc.: *See—*
Mc Queen, John; and Minutillo, Leonard D., 3,588,569.
Grimes, James G.: *See—*
Reikes, Dan; Grimes, James G.; Hale, Carl R.; and Lott, Lewis E.,3,587,576.
Grimes Manufacturing Co.: *See—*
Nordquist, Robert G., 3,588,493.
Griswold, Earl N., to United States of America, Army. Nail pulling machine. 3,588,043, Cl. 254-18.
Gromme, Carl F. Balanced fluid flow control apparatus. 3,587,969, Cl. 239-76.
Grosjean, Warren J., to Eversharp, Inc. Unit for heating and dispensing aerosol products. 3,588,467, Cl. 219-214.
Gross, Kenneth W., to United States of America, Navy. Zoned array sonar system. 3,588,799, Cl. 340-6.
Gross, Robert D.; Masel, Marvin; and Scholl, Peter K., to Singer-General Precision, Inc. Multiplexed digital to A. C. analog converter. 3,588,880, Cl. 340-347.
Grosseau, Albert, to Societe Anonyme Automobiles Citroen. Mechanism. 3,587,340, Cl. 74-469.
Grosvenor, Ronald Leslie: *See—*
Jennings, Geoffrey Charles; and Grosvenor, Ronald Leslie,3,587,914.
Grozinger, Alfred; and Wohr, Rolf, to Bosch, Robert GmbH. Electrical circuit structure, and particularly voltage regulator structure for automotive vehicle use. 3,588,617, Cl. 317-101.
Grumman Aerospace Corporation: *See—*
Keller, Robert A.; Mc Gough, Wayne L.; and Sutton, Henry C., Jr., 3,587,243.
Grupul Industrial Foraj Extractie Titeiu Moinesti Str. T. Vladimirescu: *See—*
Enoiu, Constantin; and Popa, Valeriu Serfiu, 3,587,348.
Gschwandtner, Eric, to Wurlitzer Company, The. Piano tone simulation system with piezoelectric generator. 3,588,310, Cl. 84-1.13
GTE Automatic Electric Laboratories, Incorporated: *See—*
Draayer, Johannes, 3,588,386.
Fellinger, Frank, 3,588,532.
Heldman, Robert K., 3,588,842.
Higashide, Carlos S., 3,588,350.
Lee, David K. K.; and Wirsing, Howard L., 3,588,369.
Luna, Agostino; and Cafissi, Roberto, 3,588,746.
Mankowski, Louis F., Jr.; and Mills, Jeffrey P., 3,588,622.
Gualtieri, Salvatore; Marcucci, Richard; and Marcucci, Romolo. Mono-crystalline scraping apparatus and article for cleaning magnetic tape. 3,587,128, Cl. 15-236.
Guenther, Manfred H. No-cap detector for bottles on conveyors lines. 3,588,863, Cl. 340-259.
Guentner, Robert L., to Westinghouse Electric Corporation. X-ray table having a safety shield for a patient's toes and fingers. 3,588,498, Cl. 250-54.
Guernet, Jacques, to Compagnie d'Applications Mecaniques al'Electronique au Cinema et a l'Atomistique (C.A.M.E.-C.A.). Device for displacing and replacing a specimen in vacuum-tight analysis equipment. 3,587,879, Cl. 214-17.
Guienne, Paul Francois: *See—*
Bertin, Jean Henri; and Guienne, Paul Francois,3,587,773.
Guinard, Paul Andre, to Etablissements Pompes Guinard, Societe Anonyme. Sealing device for pumps and other similar machines. 3,588,124, Cl. 277-3.
Gulf & Western Industrial Products Company: *See—*
Ferko, Alexander, 3,587,828.
Porter, Raymond J., 3,588,135.
Gulf & Western Industries, Inc.: *See—*
Fredell, Gary D., 3,588,396.
Gulf Coast Pipe Inspectors, Inc.: *See—*
Lloyd, Donald, 3,588,683.
Gulf Energy & Environmental Systems, Inc.: *See—*
Wildi, Paul, 3,587,957.
Gunderson, Arnold J., to Chemtoy Corporation. Marble game with gyratory pick-up cup. 3,588,109, Cl. 273-109.
Gupta, Dinesh C.: *See—*
Chan, Joseph Y.; and Gupta, Dinesh C.,3,588,541.
Guraydin, Orhan A.; and Magerkurth, Knute W., to International Telephone and Telegraph Corporation. Vacuum coaxial relay with tandemly movable contacts and stationary grounding contacts. 3,588,410, Cl. 200-153.
Gustafsson, Carl-Erik: *See—*
Bohlin, Karl Gunnar; Gustafsson, Carl-Erik; Johnsson, Stig Arthur; and Strombeck, Per Albin,3,587,889.
Gustus, Rolfe T., to Electronic Traffic Control, Inc. Traffic control system for drive-in banks and the like. 3,588,808, Cl. 340-41.
Guth, Carl R. Gas and liquid fuel burner. 3,588,304, Cl. 431-353.

Guzak, John, Jr., to SCM Corporation. Moding control for a data communication system. 3,588,320, Cl. 178-2.

Guzman, Adolfo M.; and Hu, Paul Y., to International Business Machines Corporation. Low impedance transverse cooling of electric motors. 3,588,556, Cl. 310-58.

Haas, Ernest M., to Esterline Corporation. Servomotor shuttle guide assembly. 3,588,767, Cl. 335-209.

Haase, Elmer A.; and Kirwin, James M., to Bendix Corporation, The. Diaphragm type fluid seal. 3,587,408, Cl. 92-89.

Habosian, Kaspar, to Baird-Atomic, Inc. Background suppression system for optical spectrometer. 3,588,252, Cl. 356-82.

Hackett, Kenneth R., to Phonocopy, Inc. Electro-junction printing pulse driver circuit. 3,588,912, Cl. 346-76.

Haddock, John S. Line applicator for spinning and spin cast reels. 3,587,995, Cl. 242-84.2

Haddox Marion R. Truck and trailer connector. 3,588,146, Cl. 280-478.

Hadekel, Ruben: *See—*
Gadd, John Horace; Hadekel, Ruben; and Sumins, Edmund Joseph,3,587,396.

Hafner, Theodore. Attachment of surface wave launcher and surface wave conductor. 3,588,754, Cl. 333-21.

Hagan, William K.; and Burdick, Thomas H., to Baxter Laboratories, Inc. Vital pulse display and display process employing a repetitive scanning tape system to minimize display flicker. 3,587,564, Cl. 128-2.06

Hagen, William F., to Turbo Refrigerating Company. Cooling construction for foods products. 3,587,241, Cl. 62-63.

Hagerlof, Bernt Ingvar: *See—*
Fjallbrant, Tore Torstensson; and Hagerlof, Bernt Ingvar,3,588,743.

Hagopian, Berge, to North American Rockwell Corporation. Acceleration-deceleration pneumatic device. 3,587,397, Cl. 91-399.

Haigh, Richard Woollisscroft; and Commander, Frederick Vincent, to U. M. Electrical Distributors Limited. Control device responsive to a sequential code. 3,587,950, Cl. 317-134.

Haiken, Robert M., to Becton, Dickinson and Company. Diaphragm mounting for stethoscope chest piece. 3,587,776, Cl. 181-24.

Haldor F. A. Topsoe: *See—*
Vabo, Bent Bors; and Andersen, Per Heymann, 3,587,669.

Hale, Carl R.: *See—*
Reikes, Dan; Grimes, James G.; Hale, Carl R.; and Lott, Lewis E.,3,587,576.

Halinski, Michael J.; and Wanschek, Larry, to Sun Electric Corporation. Circuit protection apparatus for disabling high voltage to a cathode ray tube. 3,588,608, Cl. 317-31.

Hall, Daniel Luce: *See—*
Parquet, Donald James; and Hall, Daniel Luce,3,587,630.
Parquet, Donald James; Hall, Daniel Luce; and Gregerson, Stanley Martin,3,587,399.

Hallerberg, Don M., to Hi Tek Corporation. Sealed switch arrangement. 3,588,423, Cl. 200-168.

Halley, Robert; Bolam, Robert J.; and Marshall, Carroll W., to United States of America, Navy. Proportional bandwidth frequency analyzer. 3,588,693, Cl. 324-778.

Halliday, John Stephen; Merren, Thomas Oliver; and Heath, John Stewart, to Associated Electrical Industries Industries Limited. Mass spectrometers having adjustable beam defining slits. 3,588,495, Cl. 250-41.9

Halsall, James Richard, to Imperial Chemical Industries Limited. Counter for electrical pulses. 3,588,461, Cl. 235-92.

Halsey, Gordon, to Monsanto Chemicals Limited. Production of moulds and castings. 3,587,713, Cl. 164-131.

Hamabe, Ichizo: *See—*
Matsumoto, Ken; and Hamabe, Ichizo,3,588,072.

Hamaguchi, Ichiro: *See—*
Ono, Shigeo; and Hamaguchi, Ichiro,3,587,421.

Hammer, Herman J.; Heald, Sherman T.; and Royce, Frank A., to Republic Steel Corporation. Method and apparatus for high speed welding of stainless steel tube. 3,588,424, Cl. 219-8.5

Hammond, Malcolm Perry: *See—*
Johnson, James Burl, Jr.; Hammond, Malcolm Perry; and Starnes, Billy Wayne,3,588,182.

Hamptman, Frederic, to Kollsman Instrument Corporation. Sensitive metric altimeter. 3,587,518, Cl. 116-129.

Hampton, Thomas L., to General Electric Company. Dump bleed system for the compressor of a gas turbine engine. 3,588,268, Cl. 415-145.

Hampton, William, to Goodyear Aerospace Corporation. Vertical radiator antenna structure which eliminates the necessity of a ground plane. 3,588,903, Cl. 343-792.

Hansen, Donald E., to Mosler Research Products, Inc. Security alarm system. 3,588,865, Cl. 340-276.

Hansen, Howard C., to Clark Equipment Company. Means and method for transporting articles with a conveyor system. 3,587,818, Cl. 198-20.

Hansen, Robert B., to Motorola, Inc. Automatic brightness control circuit for establishing the black level of signals in a television receiver. 3,588,341, Cl.

Hanser, Paul Edmund, to Deere & Company. Directional control valve. 3,587,640, Cl. 137-596.14

Hanus, Jean, to Dunlop Company Limited, The. Giant tyres. 3,587,703, Cl. 152-209.

Hanway, Howard D. Material handling apparatus for vehicles. 3,587,885, Cl. 214-84.

Hanzi, Carl W.; and Laing, James M., to Borg-Warner Limited. Variable speed transmission for automotive vehicles. 3,587,347, Cl. 74-759.

Hara, Syozi: *See—*
Tanaka, Tamotsu; and Hara, Syozi,3,587,923.

Harada, Takeshi: *See—*
Kimberley, John A.; Hussey, Russell B.; Inoue, Takashi; Masuda, Takao; and Harada, Takeshi,3,587,535.

Hardardt, Alfred T.; and Uberbacher, Edward C., to International Business Machines Corporation. Connector assembly. 3,588,785, Cl. 339-64.

Harden, Phillip L., to Bowmar Instrument Corporation. Electromagnetic indicating apparatus. 3,588,888, Cl. 340-378.

Hardison, Artson P., to Schulz Tool and Manufacturing Co. Valve. 3,587,622, Cl. 137-220.

Hardwick, William Horton: *See—*
Laundy, Brian John Russell; and Hardwick, William Horton,3,588,504.

Harlow, Willis Edward, to Fedders Corporation. Mounting assembly. 3,588,018, Cl. 248-223.

Harriague, Jeanine A. Process for the placement of a sealing strip on a bathing cap, and bathing cap made by the said process. 3,587,113, Cl. 2-68.

Harriau, Robert R.; and Rudd, Wallace C., to AMF Incorporated. Method and apparatus for hi-frequency welding edges advanced in parallel. 3,588,426, Cl. 219-67.

Harriott, Billie L. Combination vine trainer and harvester. 3,587,217, Cl. 56-327.

Harris, George W.; and Good, Elmer H., said Good assor. to said Harris. Stackable mercury flask. 3,587,904, Cl. 220-3.

Harris, Halbert M.; Headd, Franklin L.; Huber, Charles L.; Rugaber, Robert H.; and Tilly, Ralph R., to Xerox Corporation. Facsimile transceiver apparatus. 3,588,335, Cl. 178-6.6

Harris Intertype Corporation: *See—*
Sarka, Albert J., 3,587,413.

Harris, John R.; and Rigsby, Gerald E., to General Motors Corporation. Automobile headlight system including time delay circuit of cigar lighter. 3,588,591, Cl. 315-77.

Harris, Richard A., to Western Electric Company, Incorporated. Opposed pulley arrangement for eliminating the tension of an electrical cable connected to a movable table. 3,588,388, Cl. 191-12.

Harris, Richard A., to Western Electric Company, Incorporated. Roving limit indicator. 3,588,867, Cl. 340-282.

Harris-Intertype Corporation: *See—*
Kabrick, Wallace J., 3,588,726.
Kolb, Edwin R.; Blaha, John F.; and Roberts, Webster C., 3,588,870.
Kolb, Edwin R.; and Grace, Charles H., 3,588,872.

Harrison, Stanley, to KEV Electronics Corporation. Beam scanner with deflection plate capacitance feedback for producing linear deflection. 3,588,717, Cl. 328-229.

Harrow, Charles Richard, to Solitron Devices, Inc., mesne. Electronic ignition circuit. 3,587,551, Cl. 123-148.

Harter, Robert M., to General Motors Corporation. Vacuum torque actuator. 3,588,036, Cl. 251-61.

Hartman, Lee E.: *See—*
Walters, Leslie K.; and Hartman, Lee E.,3,587,783.

Hartz, Gerald, to Reynolds Metals Company. Transfer mechanism. 3,587,823, Cl. 198-27.

Harvey, Robert J., 25% to Del Ben, Reno A. Sample holder with pivotally mounted retaining member. 3,588,259, Cl. 356-244.

Harwell, Jack B., to Electronic Control Corporation. AC power control circiuts for reactive power loads. 3,588,647, Cl. 318-227.

Hashimoto, Yuji: *See—*
Miyamatsu, Yasunori; Hashimoto, Yuji; and Enari, Shoji,3,587,598.

Haskon, Inc.: *See—*
King, Percy, 3,587,677.

Hastings, Elizabeth G. Device for discouraging smoking and over-eating. 3,587,590, Cl. 128-359.

Hatsukano, Yoshikazu; and Tsugihashi, Hajime, to Hitachi, Ltd. Chattering preventing circuit. 3,588,525, Cl. 307-202.

Haug, Ernst: *See—*
Reinhard, Theodor; and Haug, Ernst,3,588,016.

Hauser, Raimund: *See—*
Holler, Hermann, 3,587,431.

Hausmann, Erwin: *See—*
Keilholz, Friedrich; Hausmann, Erwin; and Jentsch, Erwin,3,587,789.

Hauspurg, Arthur. Apparatus for reducing switching transients on shunt compensated high voltage transmission lines. 3,588,604, Cl. 317-11.

Haveg Industries, Inc.: *See—*
Havewala, Jamshed Behram, 3,588,314.

Havewala, Jamshed Behram, to Haveg Industries, Inc. Pole riser member with ventilation shield. 3,588,314, Cl. 174-45.

Hay, William D.: *See—*
Weinstock, Jacques J.; and Hay, William D.,3,588,507.

Hayden, John H., to Signetics Corporation. Semiconductor structure having controlled boron impurity diffusion profile. 3,588,633, Cl. 317-234.

Hays, George E., to Phillips Petroleum Company. Plural refigerant tray type heat exchanger. 3,587,731, Cl. 165-140.

Hays, Norman W.: *See—*
Romanowski, Albert F.; May, Larry A., and Hays, Norman W.,3,587,808.

Hays, Robert F., Jr., to Teledyne, Inc. Aircraft instrument system. 3,587,311, Cl. 73-180.

Hayward, Dutton H.: *See—*
Schulein, Joseph, 3,588,828.

Hayward, Louis C., Jr. Long distance visual monitor of electrical current or voltage input to an electrical load condition. 3,588,860, Cl. 340-248.

Haywood, H. Dutton,: *See—*
Schulein, Joseph, 3,588,889.

Hazeltine Research, Inc.: *See—*
Wallingford, Clarence Robert, 3,588,544.

Head, William John, to Electro Tech Appliance Service Limited. Status signalling system. 3,588,868, Cl. 340-286.

Headd, Franklin L.: *See—*
Harris, Halbert M.; Headd, Franklin L.; Huber, Charles L.; Rugaber, Robert H.; and Tilly, Ralph R.,3,588,335.

Headington, Edward E.: *See—*
Hile, Clark Vinton; Marks, Richard L.; and Headington, Edward E.,3,588,030.

Heald, Sherman T.: *See—*
Hammer, Herman J.; Heald, Sherman T.; and Royce, Frank A.,3,588,424.

Heath, Clarence Willans, deceased0 (by Heath, Ivy Eveline; heir). Electrical switch. 3,588,402, Cl. 200-67.

Heath, Ivy Eveline: *See—*
Heath, Clarence Willans,3,588,402.

Heath, John Stewart: *See—*
Halliday, John Stephen; Merren, Thomas Oliver; and Heath, John Stewart,3,588,495.

Hebeler, Charles B.: *See—*
Pedersen, John H.; Malmer, Michael M., Jr.; Hebeler, Charles B.; and Chang, Hoy Ying,3,588,834.

Heberlein Patent Corporation: *See—*
Ritter, Helmut, 3,587,961.

Hedlund, Roger C.: *See—*
Deboo, Gordon J.; and Hedlund, Roger C.,3,588,671.

Heesch, Hans: *See—*
Wehr, Georg; Gotze, Gotthold; and Heesch, Hans,3,587,681.

Heft, Eldon B., to General Electric Company. Circuit breaker with low short circuit magnetic tripping means. 3,588,763, Cl. 335-16.

Heft, Eldon B.; and Klein, Keith W., to General Electric Company. Electric circuit interrupter with magnetic trip level adjusting means. 3,588,761, Cl. 335-16.

Heidenreich, Karl-Heinz; and Neuscheler, Friedrich, to Wandel & Goltermann. Protective system for thermal transducer. 3,588,614, Cl. 317-41.

Heidenreich, Max: *See—*
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Wasser, Willi; Browatzki, Kurt; Friedsam, Joseph; and Heidenreich, Max,3,587,962.

Heier, Robert J., to Owens-Illinois, Inc. Container packages. 3,587,846, Cl. 206-65.

Heine, Gunter; Droge, Carsten; Ludemann, Joseph; Koch, Ingo; and Christoffers, Elimar, to Licentia Patent-Verwaltungs-GmbH. Speed-controllable capacitor motor. 3,588,649, Cl. 318-224.

Heinrich, Helmut Ernst Adolf, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Device for cleaning the baffle walls of baffle crushing machines. 3,587,983, Cl. 241-64.

Heinrichs, Heinz Gerd. Document strong box. 3,587,486, Cl. 109-51.

Heitert, Robert D. Stabilizer for an automobile. 3,588,143, Cl. 280-150.

Helbig, Roland: *See—*
Walter, Reinhard Jurgen Joachim; and Helbig, Roland,3,588,458.

Heldman, Robert K., to GTE Automatic Electric Laboratories Incorporated. Random setting of a scanner. 3,588,842, Cl. 340-172.5

Heller, Macy E.; and Gerritsen, Hendrik J., to RCA Corporation. High resolution laser engraving apparatus. 3,588,439, Cl. 219-121.

Hellstrom, Melbourne J.; and Laughinghouse, Charles L., to Westinghouse Electric Corporation. Control circuit with temperature compensation. 3,588,535, Cl. 307-235.

Helm Instrument Company, Inc.: *See—*
Furfaro, Blase J.; and Wilhelm, Donald F., 3,588,695.

Hemphill, Charles Wayne; and Goldkuhle, Werner Peter, to Concentric Engineering Company. Method of baling material. 3,587,448, Cl. 100-3.

Henderson, Robert M.; Miller, Lowell E.; and Zechlin, Richard, to Fairbanks Morse Inc. Circuit for performing multplication by character selection utilizing a pair of unijunction transistors. 3,588,479, Cl. 235-150.52

Henderson, Stephen P.: *See—*
Wells, Paul S.; Henderson, Stephen P.; and Norgaard, Loring C.,3,587,505.

Henderson, Wayne L.; and Dills, Raymond L., to General Electric Company. Self-cleaning gas oven. 3,587,557, Cl. 126-21.

Hendricks, Charles O.: *See—*
Byrum, Grover E.; Doty, Myron L.; Hendricks, Charles O.; and Jennings, Floyd Robert,3,587,833.

Hengstler, J., K.G. Zahlerfabrik: *See—*
Walter, Reinhard Jurgen Joachim; and Helbig, Roland, 3,588,458.

Henkels and McCoy, Inc.: *See—*
Bright, Kenneth G., 3,587,629.

Hennart, Claude; Martin, Georges; and Balland, Jean Claude, to Ciba-Geigy Corporation. Apparatus for the diffusion of volatile products. 3,587,968, Cl. 239-47.

Henne, Heinrich; and Tiggesbaumker, Peter, to Polysius G.m.b.H. Method of controlling the rate of feed to an extraneously energized airswept mill. 3,587,980, Cl. 241-19.

Henriot, Georges, to Engrenages et Reducteurs (Engrenages Citroen et Ets Robert Messain reunes). Mechanisms for driving rotary kilns. 3,587,338, Cl. 74-410.

Henry, Dale V., to RCA Corporation. Method of assembly of electron tubes. 3,587,148, Cl. 29-25.16

Henry, James; and Burtis, Winfield R., to Emhart Corporation. Locking mechanism for sectional coolers. 3,587,199, Cl. 52-582.

Hensel, Walter C., to Universal Oil Products Company. Heat protected metal wall. 3,587,198, Cl. 52-741.

Hepworth & Grandage Limited: *See—*
Dearden, Alan; Castell, Edgar O. G.; and Hylton, Leslie, 3,587,712.

Herbert, Reginald S.: *See—*
Mc Bride, Richard A.; Herbert, Reginald S.; and Weintraub, Warren S.,3,588,708.

Herbruggen, Henry J.: *See—*
Miller, Leon F.; and Herbruggen, Henry J.,3,587,709.

Hercules Incorporated: *See—*
Schuemann, Wilfred C., 3,587,328.

Herd, David P.: *See—*
Fowler, John H.; and Herd, David P.,3,588,130.

Herfy's Corporation:*See—*
Gardner, Leonal P., 3,587,446.

Herlan, Alton G., 1/2 to Barry, Robert John. Electrically-operated igniter. 3,588,302, Cl. 431-254.

Herman, Ronald E.: *See—*
McCollough, William E.; and Herman, Ronald E.,3,587,651.

Hermans, Fernand Victor Francois, to Le Four Industriel Belge. Enamelling tunnel type furnace. 3,588,060, Cl. 263-28.

Hermes, Rofl, to Mannesmann-Meer Aktiengesellschaft. Hydraulic press. 3,587,136, Cl. 18-16.5

Herr, Joseph S. Air lock. 3,588,180, Cl. 302-50.

Herring, Bobby R. Hydraulic drilling tool. 3,587,757, Cl. 175-94.

Herriott, Donald R.; and Rawson, Eric G., to Bell Telephone Laboratories, Incorporated. Adjustable compensation in optical systems. 3,588,245, Cl. 355-71.

Herrmann, Johannes: *See—*
Wilde, Friedrich; and Herrmann, Johannes,3,587,593.

Herscher, Marvin Bernard; and Martin, Thomas Brooks, to RCA Corporation. Word recognition system for voice controller. 3,588,363, Cl. 179-1.5

Hersey, Harold E., to Ranco Incorporated. Fluid pressure responsible device. 3,588,395, Cl. 200-83.

Hertenstein, Irvin G. Putting lane. 3,588,117, Cl. 273-176.

Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Wasser, Willi; Browatzki, Kurt; Friedsam, Joseph; and Heidenreich, Max, to AGFA-Gevaert Aktiengesellschaft. Suction cylinder for transmitting a torque. 3,587,962, Cl. 226-95.

Hess, Thomas W.: *See—*
Galster, Thomas H.; and Hess, Thomas W.,3,588,472.

Hewlett-Packard Company: *See—*
Osborne, Thomas E.; Magleby, Kay B.; and Lukes, Joseph A., 3,588,873.

Hexdall, Andrew M. Metal cutting shears. 3,587,173, Cl. 30-251.

Hi Tek Corporation: *See—*
Hallerberg, Don M., 3,588,423.

Hi-Gear Harvester Company: *See—*
Grether, Tobias; and Donlon, Roger M., 3,587,216.

Hiab-Foco Aktiebolag: *See—*
Johansson, Fritz Agne, 3,587,401.

Hickling, Colin D., to Garrett Corporation, The. Pulse width modulating circuit providing high signal gain. 3,588,745, Cl. 332-9.

Hickman, John B., to Zenith Equipment Manufacturing Company. Coin actuated control system for a vehicle washing station. 3,587,807, Cl. 194-13.

Hieber, Ellsworth E.; Taquino, Thomas P.; and Hillery, Frank Edward, to Schulz Tool and Manufacturing Co. Flight refueling receptacle having pressure-inertia release valve. 3,587,678, Cl. 141-346.

Higashide, Carlos S., to GTE Automatic Electric Laboratories Incorporated. Wide-band D-C coupled cable transmission circuit independent of ground circuit voltage variations. 3,588,350, Cl. 178-68.

Higgins, Jerry Allen: *See—*
Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin,3,588,085.

Higuchi, Takeo. Baby carrier. 3,587,952, Cl. 224-6.

Higuma, Katutosi, to Kabushiki-Kaisha Chukyo Gijutsu Center. Open-box type DC solenoid. 3,588,770, Cl. 335-255.

Hilborn, Edwin H.; and Bullinger, Hans B., to United States of America, National Aeronautics and Space Administration. Plasma-fluidic hybrid display. 3,588,874, Cl. 340-324.

Hilbrands, Jan Willem, to Maschinenfabrik Koppern & Co., KG. High speed control valve for hydraulic drives. 3,587,394, Cl. 91-39.

Hild, Mark W., II: *See—*
Stewart, Mark C., 3,588,098.

Hile, Clark Vinton; Marks, Richard L.; and Headington, Edward E., to HRB-Singer, Inc. Apparatus for printing either continuous or predetermined lengths of film. 3,588,030, Cl. 250-65.
Hill, Halbert R.; and Siverson, Garfield, C. Salad making apparatus. 3,587,687, Cl. 146-78.
Hillery, Frank Edward: *See—*
Hieber, Ellsworth E.; Taquino, Thomas P.; and Hillery, Frank Edward,3,587,678.
Himes, Raymond H. Monitor system for vehicle lights. 3,588,816, Cl. 340-80.
Hinds, Cyril, to Oil Center Research, Inc. Plural article forming mold. 3,588,029, Cl. 249-127.
Hirano, Isao; and Nakamima, Nofuhito, said Nakajima assor. to said Nichiban Co., Ltd. Automatic adhesive tape dispenser. 3,587,376, Cl. 83-110.
Hirata, Tsuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Control for charging generator. 3,588,663, Cl. 320-39.
Hirose, Yutaka: *See—*
Toyama, Yoji; and Hirose, Yutaka,3,588,296.
Hirsch, Gunter: *See—*
Fussner, Paul; Hirsch, Gunter; and Vogt, Dieter,3,587,977.
Hirsch, John C., Jr.: *See—*
Smith, George B.; and Hirsch, John C., Jr.,3,587,273.
Hirsch, Kurt: *See—*
Dubravec, Vladimir; and Hirsch, Kurt,3,588,582.
Hirsch, Richard F. Moving target and rotating centrifugal projector. 3,588,110, Cl. 273-119.
Hirsch, Willy. Temperature-regulation for flat offset presses. 3,587,462, Cl. 101-287.
Hirshfield, Edward, to Sylvania Electric Products Inc. Tracking filter. 3,588,752, Cl. 333-17.
Hirt, Walter, to Schmidt, Alfred, Ing. Adjustable control mechanism for movably mounted blade of snow-plough. 3,587,182, Cl. 37-41.
Hirt, Walter, to Schmidt, Alfred, Ing. Sanding hopper. 3,588,155, Cl. 291-1.
Hitachi, Ltd.: *See—*
Hatsukano, Yoshikazu; and Tsugihashi, Hajime, 3,588,525.
Isogai, Tokio; Tahara, Takashi; and Inoue, Toshio, 3,588,319.
Nishimoto, Tetsunori; Nakazawa, Kisaburo; Ishihara, Koichiro; and Horikoshi, Hisashi, 3,588,484.
Yamamoto, Manabu; Murayama, Seiichi; and Matsuno, Hiromitsu, 3,588,594.
Yamamoto, Shinji, 3,588,822.
Hitomi, Nobuteru: *See—*
Takahashi, Koichi; and Hitomi, Nobuteru,3,587,346.
Hjort, Lars Ake Valdemar: *See—*
Lindahl, Carl-Axel; Ohlsen, Bengt Ludvig; and Hjort, Lars Ake Valdemar,3,588,272.
Hoag, Kip J.: *See—*
Gersch, Richard G.; and Hoag, Kip J.,3,588,212.
Hobart Manufacturing Company, The: *See—*
Athey, Stuart E., 3,588,680.
Hochstein, Roland; Borner, Gerhard; and Taesler, Rudolf, to Zeiss Ikon Aktiengesellschaft. Motion picture camera with movable handle. 3,588,239, Cl. 352-243.
Hoeffer, Herbert; Knirsch, Herbert; and Rehm, Siegfried, to Schlumberger overseas Messgeratebau und Vertrieb GmbH. Audio to UHF frequency synthesizer including a plurality of phase-locked oscillators. 3,588,731, Cl. 331-2.
Hoelscher, Robert Lehn, to Eastman Kodak Company. Peak detector. 3,588,722, Cl. 329-204.
Hoffmann-La Roche Inc.: *See—*
Ziedonia, Janis Gunars, 3,587,561.
Hoffmeyer, William R.; and Rediger, Alvin L., to General Electric Company. Dynamoelectric machine stator and laminations for use in same. 3,588,561, Cl. 310-216.
Hofman, Jan August Marcel: *See—*
Van Roessel, Frederik Johannes; and Hofman, Jan August Marcel,3,588,827.
Hofmann, Eberhard; Muller, Rolf; and Staudt, Heinrich, to Bosch, Robert, G.m.b.H. RPM Regulating system for internal combustion engines operating on injected fuel. 3,587,540, Cl. 123-102.
Hogg, Heinrich, to Eidophor A.G. Cathode ray device with a replaceable cathode. 3,588,574, Cl. 313-237.
Holcomb, Richard H.: *See—*
Levand, Victor A., Jr.; Thomasson, Gene I.; and Holcomb, Richard H.,3,588,315.
Hold, Peter, to USM Corporation, mesne. Controlled deflection roll. 3,587,152, Cl. 29-116.
Holden Industries, Inc.: *See—*
Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin, 3,588,085.
Holford, Frank L.: *See—*
Black, Walter L.; and Holford, Frank L.,3,588,050.
Holik, Karl: *See—*
Puhringer, Othmar; and Holik, Karl,3,587,760.
Holler, Hermann, to Vockenhuber, Karl, and Hauser, Raimund. Arrangement for indication of the zone of sharpness. 3,587,431, Cl. 95-44.
Holley Carburetor Company: *See—*
McCollough, William E.; and Herman, Ronald E., 3,587,651.
Hollien, Harry F. Apparatus using radiation sensitive switch for signalling and recording data. 3,588,512, Cl. 250-213.
Holloway, James T. Spray boom apparatus. 3,587,624, Cl. 137-344.
Holm, James P. Stereophonic loudspeaker system. 3,588,355, Cl. 179-1.
Holmes, Lloyd H., to LTV Electrosystems, Inc. Indicating and seal activating device and method. 3,587,405, Cl. 92-5.
Holt, Anatol W., to Stelledar, Inc. Board game involving the matching of a randomly arrayed group of pieces. 3,588,112, Cl. 273-130.
Holzer, John M.; and Severson, Palmer T., to Cutler-Hammer, Inc. Diverting switch mechanism for conveyors. 3,587,826, Cl. 198-83.
Holzgruber, Wolfgang; and Kleinhagauer, Otmar, to Gebr. Bohler & Co. Aktiengesellschaft. Plant for producing ingots differing in size by an electric remelting of metal. 3,587,715, Cl. 164-252.
Homogeneous Metals, Inc.: *See—*
Wentzell, Joseph M., 3,588,071.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Honda, Soichiro; and Masui, Hideo, 3,588,141.
Oguma, Tomio; Nishimura, Sadanori; and Satomi, Tadaatsu, 3,587,354.
Honda, Soichiro; and Masui, Hideo, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for the independent suspension of the wheels of a motorcar. 3,588,141, Cl. 281-124.
Honeywell Inc.: *See—*
Akselsen, Hans, 3,588,560.
Bailey, Ronald G., 3,587,603.
Dietrich, Michele; and Godley, William P., 3,587,188.
Jordan, William F., Jr., 3,588,851.
Kamm, Donald L.; and Ross, Gene W., 3,587,852.
Kizilos, Apostolos P., 3,588,273.
Matsuda, Toshiyuki, 3,588,550.
Millam, Gerald J., 3,588,416.
Schmidt, Ross D., 3,587,230.
Shiosaki, James T., 3,588,871.
Honeywell Information Systems Inc.: *See—*
Figueroa, John W.; Morgan, William J.; and Rasmussen, Rolland R., 3,588,831.
Hopkins, Charles L., to Xerox Corporation. Fuser control circuit. 3,588,445, Cl. 219-501.
Hopkins, Robert K. Continuous casting apparatus. 3,587,718, Cl. 164-281.
Hopmans, Arthur H. Drill pipe protector. 3,588,199, Cl. 308-4.
Horikoshi, Hisashi: *See—*
Nishimoto, Tetsunori; Nakazawa, Kisaburo; Ishihara, Koichiro; and Horikoshi, Hisashi,3,588,484.
Horlander, Frank J.; and Yount, William R., to International Business Machines Corporation. Switching parameters for recording/playback of magnetic media having different coercivity and/or retentivity characteristics. 3,588,380, Cl. 179-100.2
Hornagold, Harry V.: *See—*
Brassington, Earl; Balch, James L.; and Hornagold, Harry V.,3,587,691.
Hornibrook, Robert E. Bale accumulator and discharger. 3,587,877, Cl. 214-7.
Hortlik, Frantisek: *See—*
Ripka, Josef; Junek, Jan; Marsalek, Milan; and Hortlik, Frantisek,3,587,219.
Horton, Richard W., to United McGill Corporation. Method for making a conduit fitting and the article. 3,587,163, Cl. 29-479.
Horwinski, Elwood R., to Lewis Engineering Company. Safety cable. 3,588,776, Cl. 337-415.
Hosaka, Izumi: *See—*
Sugiura, Hiroshi; Tsuge, Sakae; Hosaka, Izumi; Kusunoki, Kunio; and Fujita, Saburo,3,587,803.
Hoscheler, Hans, to Siemens Aktiengesellschaft. Circuit arrangement for monitoring the welding current of welding apparatus. 3,588,436, Cl. 219-109.
Howald, Werner E.; and Wright, Jack D., to General Electric Company. Bladed rotors. 3,588,277, Cl. 416-96.
Howard, Derek, to Fairchild Hiller Corporation. Air conditioning systems. 3,587,246, Cl. 62-501.
Howard, George C., to Pan American Petroleum Corporation. Explosively fracturing formations in wells. 3,587,743, Cl. 166-299.
Howard, Norman C.; and Wilkinson, Lawrence E., to General Electric Company. Internally shielded teletherapy source. 3,588,031, Cl. 250-106.
Howe Richardson Scale Company: *See—*
Merriam, Layton C.; and Davis, Austin L., 3,587,761.
Howland, Bradford, to Massachusetts Institute of Technology. Device for providing precise motions. 3,587,335, Cl. 74-89.15
Howland, George R., to Bendix Corporation, The. Fluidic analog control apparatus. 3,587,606, Cl. 137-81.5
Howmet Corporation: *See—*
Feagin, Roy C., 3,587,721.
Hoyler, Robert C., to Westinghouse Electric Corporation. Synchronous timing system having failure detection feature. 3,588,709, Cl. 328-63.
HRB-Singer, Inc.: *See—*
Hile, Clark Vinton; Marks, Richard L.; and Headington, Edward E., 3,588,030.
Hryniszak, Waldemar, to Clarke, Chapman & Co. Limited. Rotary regenerative heat exchangers. 3,587,724, Cl. 165-8.
Hu, Paul Y.: *See—*
Guzman, Adolfo M.; and Hu, Paul Y.,3,588,556.

Huber, Charles L.: *See—*
Harris, Halbert M.; Headd, Franklin L.; Huber, Charles L.; Rugaber, Robert H.; and Tilly, Ralph R.,3,588,335.

Hudson Products Corporation: *See—*
Davidson, Eugene M., 3,588,271.

Huffman, William A.: *See—*
Lowrey, Robert Dean; and Huffman, William A.,3,588,501.

Hughes Aircraft Company: *See—*
Basiulis, Algerd, 3,587,725.
Davern, Donald F., 3,587,164.
Goodwin, Francis E., 3,588,738.
Lescher, Tommy G., 3,588,854.
Morse, James H., 3,588,440.
Propster, John A., 3,588,882.

Hukee, Vernon V., to Sprague Electric Company. Electrical interconnection device. 3,588,393, Cl. 200-11.

Hultberg, Wayne Marshall, to Baxter, Laboratories. Dispenser for tubing and the like. 3,587,840, Cl. 206-52.

Humphrey, Gerald R., to Benthos, Inc. Oceanographic spherical glass instrument housing. 3,587,122, Cl. 9-8.

Hundt & Weber, G.m.b.H.: *See—*
Koennecke, Wolfgang; and Schleifenbaum, Gerhard, 3,588,412.

Hunt, Robert P.; Dickey, Baron C.; and Bousky, Samuel, to Ampex Corporation. Multiple spot, optical scanner utilizing periodic light beam re-focusing. 3,588,218, Cl. 350-7.

Hunter Engineering Company: *See—*
Hunter, Lee; and Senften, David A., 3,587,325.

Hunter, Lee; and Senften, David A., to Hunter Engineering Company. Control for dynamic wheel alignment apparatus. 3,587,325, Cl. 73-462.

Hunter Manufacturing Company: *See—*
Tait, Raymond Carl, 3,587,784.

Huntington, Robert G., to American Air Filter Company, Inc. Cupola exhaust apparatus. 3,588,068, Cl. 266-31.

Hurault, Jean Louis. System including supplementary telephone exchange equipment. 3,588,361, Cl. 179-2.5

Hurst, Douglas J., to International Telephone and Telegraph Corporation. Electrical connector filter having dielectric and ferromagnetic tubes bonded together with conductive electrode layers and having nonintegral connecting spring. 3,588,758, Cl. 333-79.

Hurter, Alfred Max, to Stadler Hurter International Ltd. Bleaching system including a single, triple-deck table washer. 3,587,257, Cl. 68-181.

Husband, Max R., 25% to McCauley, Patrick H. Electric sauna bath heater. 3,588,470, Cl. 219-378.

Huskes, Herman: *See—*
van Luyk, Johannes G. M. C. H.; and Huskes, Herman,3,587,146.

Hussey, Russell B.; Kimberley, John A.; and Snyder, Warren E., to AMBAC Industries, Incorporated. Fuel injection system and apparatus for use therein. 3,587,547, Cl. 123-139.

Hussey, Russell B.: *See—*
Kimberley, John A.; Hussey, Russell B.; Inoue, Takashi; Masuda, Takao; and Harada, Takeshi,3,587,535.

Huston, James Anthony; Belden, Robert Wayne; and May, Kenneth Devere, to Bell & Howell Company. Aligning mechanism for envelope blanks. 3,588,090, Cl. 271-1.

Hutchins, Loren H., Jr., to Simplex Wire and Cable Company. Shielded cable. 3,588,317, Cl. 174-108.

Huttenwerk Oberhausen AG: *See—*
Weineck, Hans; and Laturell, Edgar, 3,588,059.

Hydro Conduit Corporation: *See—*
Breitfuss, Thomas K.; Wallace, Floyd L.; and Zicaro, Joseph P., 3,587,659.

Hydro-Clear Corporation: *See—*
Ross, David S., 3,587,861.

Hyland, John E.; and Mc Laughlin, Frank C., to Alcan Research and Development Limited. Method for moving a house section or the like. 3,587,890, Cl. 214-152.

Hylton, Leslie: *See—*
Dearden, Alan; Castell, Edgar O. G.; and Hylton, Leslie,3,587,712.

Hymatic Engineering Company Limited, The: *See—*
Loader, Jesse, 3,587,631.

ICP, Inc.: *See—*
Murgas, Karl M.; Greenberg, Burton; and Clark, Otto A., 3,588,244.

Ideal Toy Corporation: *See—*
Cooper, Julius, 3,587,191.

Idemitsu Petrochemical Co., Ltd.: *See—*
Tokumitsu, Ichiro; Okamura, Mitsumaro; and Asano, Souji, 3,587,727.

Iijima, Tetsuya, to Nissan Motor Company, Limited. Hydraulic control system for an automatic transmission mechanism. 3,587,353, Cl. 74-868.

IIT Research Institute: *See—*
Camras, Marvin, 3,588,334.
Camras, Marvin, 3,588,623.

Ikezu, Yohei, to Kabushiki Kaisha Ricoh. Finder lens system in viewfinder. 3,587,383, Cl. 88-1.5

Ikezu, Yohei, to Kabushiki Kaisha Ricoh. Variable-magnification micro-film projector employing interchangeable lenses with constant exit pupil positioning. 3,588,226, Cl. 350-183.

Imai, Toshio: *See—*
Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi,3,588,243.

Imperial Chemical Industries, Limited: *See—*
Eggleston, Philip William, 3,587,220.
Halsall, James Richard, 3,588,461.
Mc Farland, John, 3,587,905.
Morris, Gwynfryn John; and Kirk, Michael Tayler, 3,587,996.

Improved Machinery, Inc.: *See—*
Luthi, Oscar, 3,587,451.

Inaba, Masao; Nakumura, Harunobu; and Mizukami, Mineo, to Nippon Electric Company, Limited. Modulator employing a plurality of unidirectional admittance circuits for generating a piecewise linear approximation of the desired modulation curve. 3,588,748, Cl. 332-44.

Industrial Magnetics, Inc.: *See—*
Prevett, Peter Dominic; and Morin, Theodore Joseph, 3,588,437.

Industrial Micronics Incorporated: *See—*
Raickle, John A., 3,587,160.

Industrial Research Products, Inc.: *See—*
Carlson, Elmer Victor; Cross, Floyd Warren; and Killion, Mead Clifford, 3,588,383.

Industrial Shoe Machinery Corporation: *See—*
Schultz, George; and Dziki, Michael, 3,587,930.

Industrial Tectonics, Inc.: *See—*
Greby, Daniel F., 3,588,207.

Ingersoll Locks Limited: *See—*
Berry, Daniel Victor, 3,587,261.

Ingersoll-Rand Company: *See—*
Bangerter, Kenneth R.; and Law, John P., 3,587,683.
Seccombe, Robert J.; and Willson, Jack E., 3,587,269.

Ingram, Orville, to Midland-Ross Corporation. Reinforced fiberglass hatch cover. 3,587,476, Cl. 105-377.

Inoue, Takashi: *See—*
Kimberley, John A.; Hussey, Russell B.; Inoue, Takashi; Masuda, Takao; and Harada, Takeshi,3,587,535.

Inoue, Toshio: *See—*
Isogai, Tokio; Tahara, Takashi; and Inoue, Toshio,3,588,319.

Institut de Recherches de la Siderurgie Francaise: *See—*
Fulchiron, Jean, 3,588,178.

Intercontinental Machinery Corporation: *See—*
Oppenheim, Henry; and Walker, Jonas, 3,587,378.

International Basic Economy Corporation: *See—*
Raymond, Robert E., 3,587,635.

International Business Machines Corporation: *See—*
Abramson, Paul; and Emerson, Lawrence W., 3,588,719.
Appel, Arthur; and Taschler, Edward J., 3,588,430.
Beausoleil, William F.; and Uberbacher, Edward C., 3,588,408.
Belady, Laszlo A.; Kuehner, Carl J.; Lehman, Meir M.; and Randell, Brian, 3,588,839.
Berlier, Richard A.; and Rice, Russell W., 3,588,242.
Boland, Lawrence J.; and Granito, Gerry D., 3,588,829.
Brearley, Lawrence E.; Jensen, Stanley M.; Subik, Vincent P.; and Williams, Gordon L., 3,588,615.
Byrne, Thomas M.; and Leoff, Arkady, 3,588,176.
Cater, Jack; Johnson, Fred W.; and Wehmer, Bruno F., 3,588,119.
Chow, Chao K.; and Liu, Chao N., 3,588,823.
Cobb, Richard O.; and Lipp, James, 3,588,820.
Duda, William L.; and Terman, Lewis M., 3,588,830.
Dym, Herbert, 3,588,345.
Guzman, Adolfo M.; and Hu, Paul Y., 3,588,556.
Hardardt, Alfred T.; and Uberbacher, Edward C., 3,588,785.
Horlander, Frank J.; and Yount, William R., 3,588,380.
Linton, Richard H.; and Sonoda, George Y., 3,588,846.
Mathisen, Einar S., 3,588,217.
McGroddy, James C., 3,588,736.
Nelson, Paul E., 3,588,451.
Scully, Richard F., 3,588,855.
Tech, Donald D., 3,588,596.
Terman, Lewis M., 3,588,528.
Wieder, Harold, 3,588,508.
Wilczynski, Janusz S.; and Tibbetts, Raymond E., 3,588,228.
Zarowin, Charles B., 3,588,590.

International Computers Limited: *See—*
Balazs, Miklos, 3,588,654.

International Harvester Company: *See—*
Packard, Norman M., 3,587,155.

International Patents & Development Corporation: *See—*
Price, Howard; and Szilagyi, Bela, 3,587,592.

International Register Company: *See—*
Banathy, Eugene D.; Rosenski, Julius R.; and Sechrist, Claude Jerome, 3,588,391.

International Standard Electric Corporation: *See—*
Avignon, Michel L.; and Mader, Joseph L., 3,588,878.
Delves-Broughton, Paul Nicholas, 3,588,313.
Manship, Roger Alan, 3,588,707.
Mc Neilly, Joseph Hood; and Manship, Roger Alan, 3,588,365.
Moye, Laurence Stanley, 3,588,385.
Thyssens, Guido Maria Josepha Benedikt, 3,588,373.

International Telephone and Telegraph Corporation: *See—*
Guraydin, Orhan A.; and Magerkurth, Knute W., 3,588,410.
Hurst, Douglas J., 3,588,758.
Keller, Hans; and Lowel, Fritz, 3,588,721.

Sellari, Daniele, Jr., 3,588,357.
White, Stanley E.; Platt, Eric G.; and Olson, Walter L., 3,588,367.
Ireland, Graham A.; and McNaughton, Douglas L., to Leigh Instruments Limited. Altimeter indicating mechanism incorporating flexible rotary coupling. 3,587,320, Cl. 73-386.
Isaacs, Anthony L., to Thorn Electrical Industries Limited. Lighting-control systems. 3,588,598, Cl. 315-199.
Ishihara, Koichiro: *See—*
Nishimoto, Tetsunori; Nakazawa, Kisaburo; Ishihara, Koichiro; and Horikoshi, Hisashi,3,588,484.
Ishii, Kazuzo: *See—*
Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi,3,588,243.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Kawabe, Morihiko, 3,588,306.
Yasukawa, Shozo; and Aoshika, Masayuki, 3,588,309.
Isogai, Tokio; Tahara, Takashi; and Inoue, Toshio, to Hitachi, Ltd. Condenser type terminal devices employing unit insulating cylinders. 3,588,319, Cl. 174-143.
Isreeli, Jack; and Kassel, Aaron, to Technicon Corporation. Method and apparatus for the pumping of fluids at substantially constant flow rate. 3,588,281, Cl. 417-53.
Itek Corporation: *See—*
Aspden, Ronald, 3,587,195.
Bartlett, Richard F.; and Case, Laura K., 3,587,465.
Ivanhoe Research Corporation: *See—*
Rovin, Herman; and Schiffmacher, Fred J., 3,588,087.
Ivanko, Michael F., to Singer Company, The. Control mechanisms for bobbin thread replenishing apparatus. 3,587,494, Cl. 112-184.
Ivanko, Michael F.; and Ketterer, Stanley J., to Singer Company, The. Bobbin thread replenishing mechanisms for sewing machine with oscillating shuttle. 3,587,493, Cl. 112-181.
J & T Engineers (ascot) Limited: *See—*
Tindall, David; and Needham, Arthur Michael, 3,587,970.
Jackman, Clude A.: *See—*
Turner, Elbert L.; Rapoza, James P.; and Jackman, Clude A.,3,588,716.
Jackson, Byron, Inc.: *See—*
Jones, Taylor L.; and Turner, John W., Jr., 3,588,162.
Jacobellis, Alphonse A.; and Zahid, Abduz, to Greer Hydraulics, Inc. Spherical accumulator. 3,587,653, Cl. 138-30.
Jacobs, James W., to General Motors Corporation. Air conditioner with receiver in accumulator. 3,587,245, Cl. 62-503.
Jacobs, John E., to Northwestern University. Ultrasonic image color display system. 3,587,298, Cl. 73-67.6
Jacobson, Nils B.; and Bolmgren, Jan R., to Medinova Aktiebolag. Arrangement for determing the refraction of the human eye. 3,588,235, Cl. 351-19.
Jacuzzi Research, Inc.: *See—*
Jacuzzi, Roy A., 3,587,976.
Jacuzzi, Roy A., to Jacuzzi Research, Inc. Tub installable hydrotherapy assembly. 3,587,976, Cl. 239-428.5
Jaensch, Klaus H. High speed print hammer construction. 3,587,456, Cl. 101-93.
Jagos, Frantisek, to Tesla, narodni podnik. Core holding arrangement for shuttleless coil winding machine. 3,587,988, Cl. 242-4.
Jakeway, Gerald V., to Keeler Brass Company. Louver assembly. 3,587,442, Cl. 98-110.
Jaklevic, Robert C.; and Lambe, John J., to Ford Motor Company. Macromolecular memory circuit. 3,588,637, Cl. 317-238.
James, Glen Stuart: *See—*
Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin,3,588,085.
Jamesbury Corporation: *See—*
Lewis, Robin B., 3,588,652.
Jarnuszkiewicz, Stanislaw. Accumulator chamber for supplying fuel to a rotary piston engine. 3,587,533, Cl. 123-8.09
Jasperson, Robert E., to Trident Engineering Associates, Inc. Aerohydro interface measuring system. 3,587,309, Cl. 73-170.
Jaumotte, Andre Louis. Air-cushion vehicle. 3,587,772, Cl. 180-121.
Jauquet, Christian, to Ateliers de Constructions Electriques de Charleroi (ACEC) Societe Anonyme. Device for transmitting information between a fixed location and a railway vehicle. 3,588,372, Cl. 179-82.
Jeffrey, William B., to Westinghouse Air Brake Company. Locomotive brake control system suited for remote multiple unit operation. 3,588,184, Cl. 303-20.
Jenkins, Peter J.: *See—*
Robinson, Peter M.; and Jenkins, Peter J.,3,587,832.
Jenn-Air Corporation: *See—*
Cerola, Joseph J., 3,587,555.
Jennings, Floyd Robert: *See—*
Byrum, Grover E.; Doty, Myron L.; Hendricks, Charles O.; and Jennings, Floyd Robert,3,587,833.
Jennings, Geoffrey Charles; and Grosvenor, Ronald Leslie, to Marston Excelsior Limited. Self sealing units for fuel cells. 3,587,914, Cl. 220-63.
Jensen, Stanley M.: *See—*
Brearley, Lawrence E.; Jensen, Stanley M.; Subik, Vincent P.; and Williams, Gordon L.,3,588,615.
Jentsch, Erwin: *See—*
Keilholz, Friedrich; Hausmann, Erwin; and Jentsch, Erwin,3,587,789.
Jeske, Carl-Heinz; and Johnston, William E., to Sub-Atlas-Werke GmbH. Dictating machine with means to prevent recording on previously recorded tape. 3,588,376, Cl. 179-100.2
Joh. Vaillant KG: *See—*
Westphal, Dieter; and Mobus, Gunter, 3,588,553.
Johannisson, Dag Olof Alfred, to AGA Aktiebolag. Exhalation valve. 3,588,041, Cl. 251-263.
Johansson, Fritz Agne, to Hiab-Foco Aktiebolag. Hydraulic radial motor. 3,587,401, Cl. 91-496.
Johns-Manville Corporation: *See—*
Strayer, John Joseph, 3,587,201.
Johnson, Arthur U.: *See—*
Budenstein, Irwin R.; Reed, Richard J.; and Johnson, Arthur U.,3,587,812.
Johnson, Christopher Linley, to Rolls-Royce Limited. Fluid metering device. 3,587,641, Cl. 137-608.
Johnson, Fred W.: *See—*
Cater, Jack; Johnson, Fred W.; and Wehmer, Bruno F.,3,588,119.
Johnson, Henry T.: *See—*
Wienert, Lloyd C.; Fitzgerald, Lynn; Sturges, Hiram A.; and Johnson, Henry T.,3,587,529.
Johnson, James Burl, Jr.; Hammond, Malcolm Perry; and Starnes, Billy Wayne, to Gifford-Hill-Western, Inc. Silo unloader apparatus and process. 3,588,182, Cl. 302-56.
Johnson, Kenneth C. Automatic fluid control device. 3,588,202, Cl. 308-122.
Johnson Products, Inc.: *See—*
Dadd, Morris V., 3,587,539.
Johnson, Ralph E., to Singer Company, The. Sewing machines. 3,587,495, Cl. 112-184.
Johnson, Ralph T., Jr., to United States of America, Atomic Energy Commission. Method and apparatus for measuring fast neutron fluences with cadmuim sulfide or cadmium selenide. 3,588,505, Cl. 250-83.1
Johnson, Wallace C., to Arcos Corporation. Electric arc overlay welding. 3,588,443, Cl. 219-137.
Johnson, Wendell J.: *See—*
Freund, Artice M.; Raad, Laura A.; and Johnson, Wendell J.,3,588,248.
Johnson, William M. Transmission. 3,587,345, Cl. 74-688.
Johnsson, Stig Arthur: *See—*
Bohlin, Karl Gunnar; Gustafsson, Carl-Erik; Johnsson, Stig Arthur; and Strombeck, Per Albin,3,587,889.
Johnston, James V., to United States of America, Army. Gyro controller. 3,588,003, Cl. 244-3.22
Johnston, William E.: *See—*
Jeske, Carl-Heinz; and Johnston, William E.,3,588,376.
Jones, John Leslie, Sr. Two piece sanitary belt. 3,587,580, Cl. 128-291.
Jones, John Leslie, Sr. One piece sanitary belt. 3,587,581, Cl. 128-291.
Jones, John Leslie, Sr. Sanitary napkin support belt. 3,587,582, Cl. 128-291.
Jones, Raymond A.: *See—*
Leathem, Douglas B.; Jones, Raymond A.; and Pope, Walter F.,3,588,612.
Jones, Taylor L.; and Turner, John W., Jr., to Jackson, Byron, Inc. Rotating flapper elevator. 3,588,162, Cl. 294-86.29
Jordan, J Paul, Jr.; and Leightner, Robert A., to General Electric Company. Current mode diode function generator. 3,588,529, Cl. 307-229.
Jordan, Robert J., to United States of America, Navy. Apparatus for measuring the concentration of gun gas and for deactivating a gun at dangerous gas levels. 3,588,497, Cl. 250-43.5
Jordan, William F., Jr., to Honeywell Inc. Memory selection apparatus. 3,588,851, Cl. 340-174.
Joslyn Mfg. and Supply Co.: *See—*
Kawiecki, Chester J., 3,588,576.
Jourdan, Gerard Charles Maurice: *See—*
LaSalle, Michel Marie Joseph; and Jourdan, Gerard Charles Maurice,3,588,821.
Jubb, Albert, to Rolls-Royce Limited. Bladed rotor assemblies. 3,588,276, Cl. 416-95.
Juillard, Yves; and Geiger, Bernard, to Societe Alsacienne de Constructions Mecaniques de Mulhouse. Thread-passing devices of shuttle-less looms. 3,587,663, Cl. 139-122.
Julius, Harold A. Road reflectors. 3,588,222, Cl. 350-100.
July, Georges, to Eastman Kodak Company. Photographic color printer. 3,588,246, Cl. 355-38.
Jumberca, S.A.: *See—*
Dalmau Guell, Jose Maria, 3,587,253.
Junek, Jan: *See—*
Ripka, Josef; Junek, Jan; Marsalek, Milan; and Hortlik, Frantisek,3,587,219.
Jungreis, Sidney W. Exercising device with load varying mechanism. 3,588,101, Cl. 272-81.
Jurikov, Jury Nikolavevich: *See—*
Kleiman, Jury Lvovich; Morkovin, Nikolai Viktorovich; and Jurikov, Jury Nikolavevich,3,588,677.
Justin Huppe: *See—*
Breymann, Gunther, 3,587,707.
Kabrick, Wallace J., to Harris-Intertype Corporation. Audio peak limiter and peak switching circuit. 3,588,726, Cl. 330-20.

Kabushiki Kaisha Ricoh: *See—*
Fukushima, Yoshio, 3,587,430.
Ikezu, Yohei, 3,587,383.
Ikezu, Yohei, 3,588,226.
Kakiuchi, Tokusaburo, 3,588,238.
Kabushiki Kaisha Tone Boring: *See—*
Yoshino, Kunihiro, 3,587,358.
Kabushiki-Kaisha Chukyo Gijutsu Center: *See—*
Higuma, Katutosi, 3,588,770.
Kahanic, Francis P., to Teletype Corporation. Encoding mechanism. 3,588,344, Cl. 178-17.
Kahn, Leonard R., to Kahn Research Laboratories, Inc. Communications system with modulation mode of received signal automatically controlling modulation mode of associated transmitter. 3,588,701, Cl. 325-15.
Kahn Research Laboratories, Inc.: *See—*
Kahn, Leonard R., 3,588,701.
Kailus, William A., to Bunker-Ramo Corporation, The. Miniature connector construction. 3,588,789, Cl. 339-217.
Kaiser Gypsum Company, Inc.: *See—*
Chiffoleau, Robert R.; and Papalia, Rocco, 3,588,082.
Kaiser, Hans-Peter: *See—*
Bammert, Wilhelm; and Kaiser, Hans-Peter,3,587,138.
Kaisler, Francis J.: *See—*
Maxwell, Richard F., Jr.; and Kaisler, Francis J.,3,588,517.
Kakiuchi, Tokusaburo, to Kabushiki Kaisha Ricoh. Automatic film loop forming device for use in miniature movie projector. 3,588,238, Cl. 352-159.
Kamm, Donald L.; and Ross, Gene W., to Honeywell Inc. Control apparatus. 3,587,852, Cl. 209-74.
Kammer, Erwin W., to United States of America, Navy. Apparatus for precise stress measurement. 3,587,297, Cl. 73-67.6
Kampf, Gunther; Vinzelberg, Bernhard; and Walz, Helmut, to Farbenfabriken Bayer Aktiengesellschaft. Process and apparatus for electrically heating and controlling the temperature of thin layers. 3,588,429, Cl. 219-50.
Kamphausen, Erich: *See—*
Reiners, Franz; and Kamphausen, Erich,3,588,088.
Kane, Thomas E., to Tek Bearing Company. Locking device for antifriction bearing ring. 3,588,208, Cl. 308-236.
Kano, Takanori: *See—*
Yanagishita, Kazuo; and Kano, Takanori,3,588,509.
Kapteyn, Bastiaan. Bubble pipe attachment. 3,587,316, Cl. 73-302.
Karlinsky, Stanislav Evgenievich: *See—*
Khimich, Georgy Lukich; Niskovskikh, Vitaly Maximovich; and Karlinsky, Stanislav Evgenievich,3,587,708.
Karrer, August. Apparatus for holding thermal lances. 3,588,303, Cl. 431-343.
Kass, Sholom. Automatic digital impulse transmission system. 3,588,362, Cl. 179-5.
Kassel, Aaron: *See—*
Isreeli, Jack; and Kassel, Aaron,3,588,281.
Katz, Irwin J.: *See—*
Benjaminson, Morris A.; Satriano, Nicholas M.; and Katz, Irwin J.,3,587,323.
Kaunitz, Clyde F. Safety rim auxiliary. 3,587,702, Cl. 152-158.
Kawabe, Morihiko, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Method and system for automatically detecting and controlling furnace operating condition of arc- furnace at charge melting stage. 3,588,306, Cl. 13-13.
Kawai, Kazuo; Shintani, Sotokichi; and Yanagidaira, Hidetaka, to Kokusai Denshin Denwa Kabushiki Kaisha. Demodulation apparatus of a phase-modulated telegraphic wave or waves. 3,588,349, Cl. 178-66.
Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Matsumoto, Ken; and Hamabe, Ichizo, 3,588,072.
Kawiecki, Chester J., to Joslyn Mfg. and Supply Co. Spark-gap device having a thin conductive layer for stabilizing operation. 3,588,576, Cl. 313-306.
Kaye, Ronald H., to Swank, Inc., mesne. Key case. 3,587,262, Cl. 70-456.
KDI Sealtron Corporation: *See—*
Newman, Albert P., 3,588,783.
Kearney & Trecker Corporation: *See—*
Griffith, Edward G., 3,587,165.
Lohneis, Earl R.; and Stobbe, Richard E., 3,587,390.
Lohneis, Earl R., 3,587,873.
Kearney, Stuart D., II, to United States of America, Navy. Handling cage for underwater vessel. 3,587,504, Cl. 114-16.
Keating, John M., to Western Electric Company Incorporated. Coating apparatus including conveyer-mask. 3,587,524, Cl. 118-70.
Kebbon, Earl R.; and Ashcraft, Joel N., to AMBAC Industries, Incorporated. Ignition system. 3,587,549, Cl. 123-148.
Keck, Robert H.; and Goode, James K., Jr., to Spotnails, Inc. Cartridge of collated fasteners. 3,587,842, Cl. 206-56.
Kee, Robert, to United States of America, Navy. Photo-electric reading system. 3,588,452, Cl. 235-61.11
Keefe, Arthur Thomas, to Evershed & Vignoles Limited. Analogue-to-digital converters. 3,588,877, Cl. 340-347.
Keeler Brass Company: *See—*
Jakeway, Gerald V., 3,587,442.
Keen, Harry Joseph, to Buck Engineering Co., Inc. Protector circuit for electrical measuring system. 3,588,609, Cl. 317-31.
Keeprite Products Limited: *See—*
Woods, Norman W., 3,587,441.
Kegel, Kurt; Zollner, Dieter; Reichelt, Bernhard; and Koziol, Konrad, to Conradty, C. Hollow carbon electrode. 3,588,307, Cl. 13-18.
Keilholz, Friedrich; Hausmann, Erwin; and Jentsch, Erwin, to August Bilstein Ennepetal. Hydropneumatic single-cylinder shock absorber. 3,587,789, Cl. 188-100.
Keiser, Irving. Earth time comparator. 3,587,225, Cl. 58-43.
Keller, Donald D., to Orthopedic Equipment Company. Inflatable tourniquet. 3,587,584, Cl. 128-327.
Keller, Hans; and Lowel, Fritz, to International Telephone and Telegraph Corporation. Demodulator for frequency modualted signals. 3,588,721, Cl. 329-129.
Keller, Herman F. Smoking pipe conditioner. 3,587,594, Cl. 131-172.
Keller, Paul, to Cornelius Company, The. Article vending mechanism. 3,587,925, Cl. 221-266.
Keller, Robert A.; Mc Gough, Wayne L.; and Sutton, Henry C., Jr., to Grumman Aerospace Corporation, mesne. Precondensing regenerative air cycle system. 3,587,243, Cl. 62-87.
Keller, Robert C.; and Walters, Leslie K., to General Motors Corporation. Transmission and controls with neutral start switch. 3,587,351, Cl. 74-850.
Keller, Toni: *See—*
Tschopp, Werner; and Keller, Toni,3,588,676.
Kelley Company, Inc.: *See—*
Potter, Roderick B.; and Slocum, Jack D., 3,587,126.
Kellogg, Robert C.; and Martin, Philip C., to Ex-Cell-O Corporation. Automatic container loader apparatus. 3,507,916, Cl. 221-11.
Kennecott Copper Corporation: *See—*
Lingmann, Orson R.; and Gold, Milton O., 3,588,686.
Kenyon, Richard L., to Parker-Hannifin Corporation. Aircraft fuel tank inerting system. 3,587,618, Cl. 137-87.
Kerma Corporation: *See—*
Forster, Klaus W.; and Schaper, Donald W., 3,587,880.
Kerr, William I., to Tri-State Oil Tool Industries, Inc. Method of retrieving a fish from a well bore. 3,587,748, Cl. 166-301.
Kershner, Stephen W.; and Owen, Kenneth, to Delta Electronics, Inc. Matrix type balanced line switch system. 3,588,390, Cl. 200-1.
Ketterer, Stanley J.: *See—*
Ivanko, Michael F.; and Ketterer, Stanley J.,3,587,493.
Keuffel & Esser Company: *See—*
Aylward, William G.; and Du Pont, William W., 3,587,202.
KEV Electronics Corporation: *See—*
Harrison, Stanley, 3,588,717.
Khimich, Georgy Lukich; Niskovskikh, Vitaly Maximovich; and Karlinsky, Stanislav Evgenievich. Method of continuous sheet metal production. 3,587,708, Cl. 164-4.
Kidde, Walter, & Company, Inc.: *See—*
Perry, Charles W.; and Wendroff, Benjamin, 3,587,745.
Silvers, Jerry J., 3,588,595.
Kiengle Apparate GmbH: *See—*
Zumkeller, Oskar; and Roth, Werner, 3,588,910.
Kihara, Yasukane; Moriyama, Ushimatsu; and Seta, Yoichi, to Tokyo Shibaura Electric Co., Ltd. Electrolytic condenser and paste composition therefor. 3,588,625, Cl. 317-230.
Kilbey, Robert W. Pelvic traction belt. 3,587,570, Cl. 128-75.
Kilgore, Lee A.; Fergestad, Ragnvald; and Schanche, Tor, to Westinghouse Electric Corporation. Low loss ventilation for salient pole machines. 3,588,557, Cl. 310-60.
Kilgus, Alfred, to Eastman Kodak Company. Coupling device for a camera. 3,587,422, Cl. 95-11.
Killion, Mead Clifford: *See—*
Carlson, Elmer Victor; Cross, Floyd Warren; and Killion, Mead Clifford,3,588,383.
Kilmer, Lauren G.: *See—*
Bemrose, John; and Kilmer, Lauren G.,3,587,774.
Kimberley, John A.; Hussey, Russell B.; Inoue, Takashi; Masuda, Takao; and Harada, Takeshi, to AMBAC Industries, Incorporated Diesel Kiki Kabushiki Kaisha. Timing signal generator Electromagnetic fuel injection system for internal- combustion engines. 3,587,535, Cl. 123-32.
Kimberley, John A.: *See—*
Hussey, Russell B.; Kimberley, John A.; and Snyder, Warren E.,3,587,547.
Kincade, Russel P. Pallet. 3,587,481, Cl. 108-53.
Kindell, Colin David; and Raynor, Terence Robert, to AMP Incorporated, mesne. Electrical connecting washer. 3,588,787, Cl. 339-95.
Kindell, Colin David; and Raynor, Terence Robert, to AMP Incorporated, mesne. Fastener with shearable fixing member. 3,588,792, Cl. 339-263.
Kindell, Colin David; and Raynor, Terence Robert, to AMP Incorporated, mesne. Panel mount wedge connector. 3,588,793, Cl. 339-276.
King, Percy, to Haskon, Inc. Feeding mechanism for a machine for filling containers of different sizes. 3,587,677, Cl. 141-167.
King, Ronald J.: *See—*
Buebel, Edgar W., Jr.; and King, Ronald J.,3,588,662.
King, William L., to Knecht, Nathan E. Commutation inverter circuit. 3,588,670, Cl. 321-45.
Kingsbury, L. C. James; and Petrie, Adelore F., to General Electric Company. Portable recording apparatus and media therefor. 3,588,122, Cl. 274-39.
Kinkead, Alan, to Ames, W. R., Company. Irrigating machine. 3,587,763, Cl. 180-14.
Kircher, Paul J., to Westinghouse Electric Corporation. Electrically operated food cooker. 3,587,445, Cl. 99-331.

Kirchner, Egon: *See—*
Stehle, Max; and Kirchner, Egon,3,587,953.

Kirk, Michael Tayler: *See—*
Morris, Gwynfryn John; and Kirk, Michael Tayler,3,587,996.

Kirwin, James M.: *See—*
Haase, Elmer A.; and Kirwin, James M.,3,587,408.

Kizilos, Apostolos P., to Honeywell Inc. Control apparatus. 3,588,273, Cl. 416-42.

Kleiman, Jury Lvovich; Morkovin, Nikolai Viktorovich; and Jurikov, Jury Nikolavevich. Device for rotation of a thermostatted sample. 3,588,677, Cl. 324-0.5

Klein, Hans Christof; Beller, Hans; and Schrader, Gert, to Teves, Alfred Maschinen- und Armaturenfabrik KG. Electrical warning system for vehicular brake installations. 3,588,810, Cl. 340-52.

Klein, Horst; and Schaefer, Manfred. Cruciform, collapsible tools, such as tire wrenches and the like. 3,587,366, Cl. 81-177.

Klein, Keith W.: *See—*
Heft, Eldon B.; and Klein, Keith W.,3,588,761.

Klein, Kenneth R.: *See—*
Ristuccia, Donald J.; and Klein, Kenneth R.,3,588,607.

Klein, Lloyd L.: *See—*
Fudge, William L.; and Klein, Lloyd L.,3,587,913.

Klein, Richard G.; Thorson, Sheldon E.; and Morris, John C., to Singer Company, The. Stability for hand operated postage meter. 3,587,453, Cl. 101-1.

Kleinhagauer, Otmar: *See—*
Holzgruber, Wolfgang; and Kleinhagauer, Otmar,3,587,715.

Kline, Lester H.: *See—*
Gano, John W.; and Kline, Lester H.,3,587,886.

Knabusch, Edward M.; and Shoemaker, Edwin J., to La-Z-Boy Chair Company. Motor-operated reclining chair. 3,588,170, Cl. 297-69.

Knapp, Paul William: *See—*
Gilbert, Richard Lapham, Jr.; and Knapp, Paul William,3,587,292.

Knapp, Peter, to Aktiengesellschaft Brown, Boveri & Cie. Circuit arrangement for improving commutation of thyristors. 3,588,542, Cl. 307-252.

Knecht, Nathan E.: *See—*
King, William L., 3,588,670.

Knirsch, Herbert: *See—*
Hoeffer, Herbert; Knirsch, Herbert; and Rehm, Siegfried,3,588,731.

Knox, Keith Anthony Thomas, to Postmaster General, Her Majesty's. Telecommunication systems. 3,588,360, Cl. 179-1.

Kobusch, Helmut: *See—*
Schrewe, Hans; Kobusch, Helmut; Liestmann, Wolf-Dietrich; Carius, Wolfhard; Vom Ende, Hans; Frenken, Klaus; and Vogt, Gerd,3,587,719.

Koch, Claude V., to AMF Incorporated. Switch actuating means. 3,588,394, Cl. 200-18.

Koch, H., & Sons, Inc.: *See—*
Gaylord, John A., 3,587,140.

Koch, Ingo: *See—*
Heine, Gunter; Droge, Carsten; Ludemann, Joseph; Koch, Ingo; and Christoffers, Elimar,3,588,649.

Koch, Karl, to Sinar AG Schaffhausen. Photographic. 3,587,432, Cl. 95-50.

Koch, Roland W.: *See—*
Campbell, Robert J.; and Koch, Roland W.,3,588,534.

Koehlke, Earl L.; Lipe, Bruce R.; and Schroeder, Earle E., to Allis Chalmers Manufacturing Company. Adjustable base for a pair of machines. 3,588,009, Cl. 248-23.

Koehring Company: *See—*
Premo, Charles N., 3,587,134.

Koennecke, Wolfgang; and Schleifenbaum, Gerhard, to Hundt & Weber, G.m.b.H. Switch device including damping means. 3,588,412, Cl. 200-166.

Koeppe, Douglas F., to Twenty-First Century Corporation. Device for producing useful forces in fluids. 3,588,006, Cl. 244-62.

Koerner, Harry E., to Westinghouse Electric Corporation. X-ray table with selective float and power drive top. 3,588,500, Cl. 250-55.

Kohl, Karl. Combined presser and guide bar mechanism for a warp knitting machine. 3,587,252, Cl. 66-86.

Kohl, Karl. Guide bar swinging mechanism for a warp knitting machine. 3,587,254, Cl. 66-86.

Kohler, Hans W., to United States of America, Army. Sensing coil arrangement for a metal detector. 3,588,687, Cl. 324-41.

Kojima, Tsuneji. Memory exercising device. 3,587,178, Cl. 35-6.

Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Kawai, Kazuo; Shintani, Sotokichi; and Yanagidaira, Hidetaka, 3,588,349.

Kolator, Tadeusz W., to Canadian Westinghouse Company, Limited. Method of making insulated electrical apparatus. 3,587,168, Cl. 29-605.

Kolb, Edwin R.; Blaha, John F.; and Roberts, Webster C., to Harris-Intertype Corporation. Apparatus for providing graphical images on cathode ray tubes. 3,588,870, Cl. 340-324.

Kolb, Edwin R.; and Grace, Charles H., to Harris-Intertype Corporation. Point size computation and exposure control device for a character display. 3,588,872, Cl. 340-324.

Kolbly, Richard B.: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,588,751.

Kollsman Instrument Corporation: *See—*
Hamptman, Frederic, 3,587,518.

Koltik, Evgeny Dmitrievich: *See—*
Kravchenko, Svyatoslav Anatolievich; and Koltik, Evgeny Dmitrievich,3,588,694.

Koltygo, Vasily Dmitrievich: *See—*
Bugaenko, Boris Andreevich; and Koltygo, Vasily Dmitrievich,3,587,507.

Kong, Gerhard; and Pieloth, Manfred, to VEB Reglerwerk Dresden. Fluidic block assembly. 3,587,607, Cl. 137-81.5

Koninklijke Nedelandse Textiel-Unie N.V.: *See—*
van Luyk, Johannes G. M. C. H.; and Huskes, Herman, 3,587,146.

Konrad, Thomas G., to United States of America, Navy, mesne. Method and apparatus for the simultaneous probing of the atmosphere by radar and meteorological sensors. 3,588,897, Cl. 343-6.

Konstant, Anthony N., to Speedrack Inc. Storage rack beam and method of making same. 3,587,483, Cl. 108-157.

Koonce, Clyde. Tire pressure warning device. 3,588,815, Cl. 340-58.

Kopicko, Walter J. Live bait holder. 3,587,189, Cl. 43-44.4

Koppers Company, Inc.: *See—*
Calistrat, Mircea, 3,587,830.
Ciochetto, Joseph J., 3,587,716.
Reinfeld, Kurt; and Gouye, Emmanuel V., 3,588,066.
Stewart, Warren A.; and Bridges, Richard J., 3,587,374.

Korenz, Edward, to Fedders Corporation. Tubing clip. 3,588,151, Cl. 287-1.

Kornbluth, Sheldon Edwin: *See—*
Krauer, Otto Albert; and Kornbluth, Sheldon Edwin,3,587,785.

Kornylak, Andrew T., to Kornylak Corporation. Material handling system. 3,587,895, Cl. 214-623.

Kornylak Corporation: *See—*
Kornylak, Andrew T., 3,587,895.

Koski, Oscar H., to United States of America, Atomic Energy Commission. Circuit for developing a pulse having an amplitude determined by the capacitance of a capacitor coupled thereto. 3,588,692, Cl. 324-60.

Kost, Erwin, to Schloemann Aktiengesellschaft. Rotary tube-testing presses. 3,587,294, Cl. 73-49.5

Kostelecky, Premysl, to Elitex, Zavody textilniho strojirenstvi. Transfer device for broken yarns. 3,587,990, Cl. 242-35.6

Kotos, Peter: *See—*
Barkan, Philip; and Kotos, Peter,3,588,520.

Kovach, Emil. Unitary carrying case. 3,587,699, Cl. 150-52.

Kovalenko, Maria Fedorovna: *See—*
Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich,3,587,673.

Koziol, Konrad: *See—*
Kegel, Kurt; Zollner, Dieter; Reichelt, Bernhard; and Koziol, Konrad,3,588,307.

Kracht, Robert, to Fried. Krupp G.m.b.H. Rolling mill assembly. 3,587,278, Cl. 72-237.

Krachy, Charles Edward: *See—*
Usen, Norman; and Krachy, Charles Edward,3,587,929.

Kratzenberg, Dietrich, to Linde Aktiengesellschaft. Hydraulic machine arrangement with a plurality of machine units. 3,587,404, Cl. 91-505.

Krauer, Otto Albert; and Kornbluth, Sheldon Edwin, to Otis Elevator Company. Elevator control system safety arrangement. 3,587,785, Cl. 187-29.

Krause, Eric George, to Nova Machinery Pty. Ltd. Leveling control for a press. 3,587,452, Cl. 100-256.

Krause, Gerhard, to Fernseh G.m. b. H. System for synchronizing the phase of color synchronization signals in the receiver to the phase of the color subcarrier in the received signal in a PAL receiver. 3,588,323, Cl. 178-5.4

Krause, Walter, to Phonix Armaturenwerke Bregel GmbH. Fill and discharge valve with manual operation. 3,587,634, Cl. 137-553.

Krauss-Maffei Aktiengesellschaft: *See—*
Lerch, Gerhard, 3,588,524.

Kravchenko, Svyatoslav Anatolievich; and Koltik, Evgeny Dmitrievich. Very-low and low-frequency precision phase calibrator. 3,588,694, Cl. 324-85.

Krechel, Joseph L. Compressor unloader and check valve unit. 3,587,619, Cl. 137-116.

Kreckel, Kurt H.; and Mannik, Kallis H., to Bausch & Lomb Incorporated. Fringe interpolator and counter. 3,588,462, Cl. 235-92.

Kreimer, Alfred, to Gray, G. A., Company. Indexing device for planer-type milling machines. 3,587,389, Cl. 90-17.

Kreuter, Kenneth G.: *See—*
Nisley, Larry V.; Mueller, Klaus P.; and Kreuter, Kenneth G.,3,587,395.

Kreutzkampf, Franz, to Siemens Aktiengesellschaft. Cooling system for supplying liquid coolant to windings of an electrical machine. 3,588,290, Cl. 417-370.

Krieger, Wilhelm: *See—*
Unterstenhoefer, Leo; and Krieger, Wilhelm,3,587,981.

Kristofl, Ferdinand, to Dorr-Oliver Incorporated. Rotary drum filter. 3,587,863, Cl. 210-404.

Kronenthal, Richard L., to Ethicon, Inc. Porous collagen anastomoti cuff. 3,587,586, Cl. 128-334.

Kruse Electronics: *See—*
Shimizu, Harry H., 3,588,753.

Kubota, Tadashi: *See—*
Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi,3,588,243.

Kuehner, Carl J.: *See—*
Belady, Laszlo A.; Kuehner, Carl J.; Lehman, Meir M.; and Randell, Brian,3,588,839.

Kuhn, Rudolf: *See—*
Schumann, Erwin; and Kuhn, Rudolf,3,587,149.

Kullmann, Donald J., to Badger Meter Manufacturing Company. Metering apparatus. 3,587,314, Cl. 73-252.

Kunkle, John Philip; and Swengel, Robert Charles, Jr., to AMP Incorporated. Electrical connector housing assembly. 3,588,784, Cl. 339-65.

Kupperman, Dennis I.: *See—*
Kupperman, Sam; and Kupperman, Dennis I.,3,588,107.

Kupperman, Sam; and Kupperman, Dennis I. Vibrating track racing game. 3,588,107, Cl. 273-86.

Kuramoto, Yoshio; and Umeda, Kaoru, to Minolta Camera Kabushiki Kaisha. Electric winding device for cameras. 3,587,998, Cl. 242-206.

Kuratomi, Tatsuo. Method of continuously casting metals. 3,587,710, Cl. 164-81.

Kurtz, Arthur E., to Armstrong Cork Company. Glass furnace charger. 3,587,881, Cl. 214-33.

Kurtz, David W.: *See—*
Cohen, Marvin M.; Penar, James D.; and Kurtz, David W.,3,588,634.

Kush, Pavel Pavlovich: *See—*
Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich,3,587,673.

Kusunoki, Kunio: *See—*
Sugiura, Hiroshi; Tsuge, Sakae; Hosaka, Izumi; Kusunoki, Kunio; and Fujita, Saburo,3,587,803.

Kuwabara, Hiroshi: *See—*
Sawada, Kunio; Matsuda, Yuzo; and Kuwabara, Hiroshi,3,588,755.

Kyokuto Giken Co., Ltd.: *See—*
Tanaka, Tameo, 3,588,038.

Kyte, Derek J.; and Stewart, David J. Photo-electric scanning and image-modifying equipment. 3,588,506, Cl. 250-83.3

La-Z-Boy Chair Company: *See—*
Knabusch, Edward M.; and Shoemaker, Edwin J., 3,588,170.

Laatsch, Walter R., 1/2 to Garot, L. F. Power driven hammers. 3,587,754, Cl. 173-117.

Labaugh, Kenneth D., to Sanders Associates, Inc. Logarithmic clock. 3,588,843, Cl. 340-172.5

Laboratory for Electronics, Inc.: *See—*
Whitehouse, George M., 3,587,644.

Lachaussee, Maurice. Rotary article transfer apparatus. 3,587,820, Cl. 198-22.

Lafaye, Michel: *See—*
Szekely, Laszlo; Pigache, Claude; and Lafaye, Michel,3,587,797.

Lagain, Georges: *See—*
Dechanciaux, Bernard, 3,587,410.

Lagemann, Klaus, to U.S. Philips Corporation, mesne. Bistable trigger circuit having different voltage threshold. 3,588,546, Cl. 307-291.

Laing, James M.: *See—*
Hanzi, Carl W.; and Laing, James M.,3,587,347.

Laithwaite, Eric Roberts; and Bolton, Hugh Robert, to National Research Development Corporation. Linear electric drive with windingless carriage means at least partially embracing conductive rail means. 3,588,555, Cl. 310-13.

Laitinen, Lauri A. Tap switch with blind slot for guiding the actuator. 3,588,409, Cl. 200-153.

Lake, Carl V. Confining structure for animals. 3,587,528, Cl. 119-16.

Laken, Vincent. Material handling attachment for lift truck. 3,587,893, Cl. 214-620.

Lambden, Joseph F.; and Thompson, John E., to Westinghouse Electric Corporation. Transmission line arc detection and location system. 3,588,611, Cl. 317-31.

Lambe, John J.: *See—*
Jaklevic, Robert C.; and Lambe, John J.,3,588,637.

Lambert, Charles E., to Visor Mirror Corporation. Extendable sun visor mirror. 3,588,233, Cl. 350-292.

Lambertz, Martin R.: *See—*
Newcomer, John I.; and Lambertz, Martin R.,3,588,020.

Lambrecht, Dietrich; and Weghaupt, Erich, to Licentia Patent-Verwaltungs-G.m.b.H. Coolant coupling head. 3,587,638, Cl. 137-580.

Lami, Rene; and Colombet, Georges, to CSF-Compagnie Generale de Telegraphie Sans Fils. Actual slope computer. 3,588,477, Cl. 235-150.22

Lanatti, Joseph H.; and Shapland, James T., to United State Steel Corporation. Supporting mechanism for multiple closures on bottom-pour vessels. 3,587,945, Cl. 222-481.

Landis, Bruce B., to Rowe International, Inc. Cup positioning assembly. 3,587,919, Cl. 221-194.

Landy, Arney, Jr., to United States of America, Navy, mesne. Optical analog-to-digital converter having dual encoder discs. 3,588,887, Cl. 340-347.

Lane, Joseph J., to Master Specialties Company. Indicator. 3,587,186, Cl. 40-132.

Laner, Sigmond Harvey: *See—*
Smith, Jerry R.; and Laner, Sigmond Harvey,3,587,837.

Langan, Marion J., to Avco Corporation. Computer circuit. 3,588,530, Cl. 307-229.

Langen & Company: *See—*
Ortheil, Johannes, 3,587,768.

Langley, Lawrence W., to Corning Glass Works. Fluid motion sensor. 3,587,610, Cl. 137-81.5

Lapointe, Lloyd J., to Veeder Industries Inc. Resettable electromagnetic counter. 3,588,476, Cl. 235-117.

Lapp, John: *See—*
Nash, William H.; Lapp, John; and Sadler, Fred S.,3,588,644.

Larkin, Dennis J. Cooking utensil. 3,587,447, Cl. 99-425.

Larsen's Manufacturing Company:*See—*
Fudge, William L.; and Klein, Lloyd L., 3,587,913.

Larson, Warren A.: *See—*
Millard, Richard J.; Larson, Warren A.; and Thompson, David G.,3,588,629.

LaSalle, Michel Marie Joseph; and Jourdan, Gerard Charles Maurice, to Societe Anonyme: Societe Alsacienne de Constructions Atomiques de Telecommunication et d'Electronique (ALCATEL). Image classifying by elemental grouping, reading and comparing. 3,588,821, Cl. 340-146.3

Latendorf Convehing Corporation: *See—*
Stadelman, Frank, 3,587,891.

Laturell, Edgar: *See—*
Weineck, Hans; and Laturell, Edgar,3,588,059.

Laughinghouse, Charles L.: *See—*
Hellstrom, Melbourne J.; and Laughinghouse, Charles L.,3,588,535.

Laundy, Brian John Russell; and Hardwick, William Horton, to United Kingdom Atomic Energy Authority. Apparatus for particle size analysis utilizing beta backscattering. 3,588,504, Cl. 250-71.5

Lauterbach, Norman E., to Sybron Corporation. High kelvin surgical lighting fixture. 3,588,488, Cl. 240-1.4

Law, John P.: *See—*
Bangerter, Kenneth R.; and Law, John P.,3,587,683.

Layne & Bowler Company, The: *See—*
Gerwick, Fred W.; and Block, Harold C., 3,587,740.

Layton, Beryl W., to Square D. Company. Mounting bracket for a molded-case electric circuit breaker. 3,588,619, Cl. 317-119.

Leach Corporation: *See—*
Martin, Carl L., 3,588,375.

Leathem, Douglas B.; Jones, Raymond A.; and Pope, Walter F., to United-Carr Incorporated. Solid state lamp flasher. 3,588,612, Cl. 317-33.

Lechler, Rolf, to NSU Motorenwerke Aktiengesellschaft. Selector valve. 3,587,649, Cl. 137-625.47

Lee Corporation: *See—*
DuVivier, Charles L., 3,588,807.

Lee, David K. K.; and Wirsing, Howard L., to GTE Automatic Electric Laboratories Incorporated. Precedence trunk selection in a central processor controlled communication switching system. 3,588,369, Cl. 179-18.

Lee, Graham, to Dorr-Oliver Incorporated. Rotary table filter apparatus. 3,587,862, Cl. 210-330.

Lee, Harold G., to Leupold & Stevens Instruments, Inc. Shaft encoder having tape punch and switch readout means actuated on two different portions of same encoder cam. 3,588,886, Cl. 340-347.

Leeming, Howard M. Towing cable control apparatus. 3,588,051, Cl. 254-190.

Leffers, Hans Ulrik; and Romer, Bendt Wegge, to Danfoss A/S. Encased motor compressor. 3,587,781, Cl. 184-6.

Le Four Industriel Belge: *See—*
Hermans, Fernand Victor Francois, 3,588,060.

Leggett and Platt Inc.: *See—*
Greeno, John S., 3,587,120.

Legue, Ronald L.: *See—*
Adkins, David E.; Legue, Ronald L.; and Widman, Michael V.,3,587,756.

Lehigh University: *See—*
Zettlemoyer, Albert C.; and Bassett, David R., 3,587,966.

Lehman, Meir M.: *See—*
Belady, Laszlo A.; Kuehner, Carl J.; Lehman, Meir M.; and Randell, Brian,3,588,839.

Lehmann, Hans Rudolf: *See—*
Bonga, Benno Ibo; Lehmann, Hans Rudolf; and Vuichard, Michel Antoine Emile,3,588,196.

Leigh Instruments Limited: *See—*
Ireland, Graham A.; and McNaughton, Douglas L., 3,587,320.

Leightner, Robert A.: *See—*
Jordan, J Paul, Jr.; and Leightner, Robert A.,3,588,529.

Leiter, Leigh D.; and Redpath, Richard J., to Singer Company, The. Registration device for fabric pieces. 3,588,096, Cl. 271-58.

Lemelson, Jerome H. Extrusion die apparatus. 3,587,281, Cl. 72-265.

Lemelson, Jerome H. Method for producing a composite material. 3,587,284, Cl. 72-363.

Lemelson, Jerome H. Coding and routing apparatus and method. 3,587,856, Cl. 209-111.7

Lengyel, Bela: *See—*
Alexander, John Malcolm; Lengyel, Bela; and Ashford, Peter Guy,3,587,270.

Leningradskoe Electromashinostroitelnoe Obiedinenie 'Electrosila' I.M.S.M. Kirova: *See—*
Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich, 3,587,673.

Leoff, Arkady: *See—*
Byrne, Thomas M.; and Leoff, Arkady, 3,588,176.

Leonard, Silvester C., to Phillips Petroleum Company. Output control for steam heated heat exchanger. 3,587,726, Cl. 165-39.

Leonard, Willie B. Impulse generator. 3,588,801, Cl. 340-12.

Lerch, Gerhard, to Krauss-Maffei Aktiengesellschaft. Electronic timer. 3,588,524, Cl. 307-141.

Lerouge, Claude Paul Henry: *See—*
Chaltelon, Andre Edouard Joseph; Lerouge, Claude Paul Henry; and Louboutin, Herve Jean Pierre Marie, 3,588,876.

Lerwill, William Edward, to Seismograph Service Corporation. Wave energy source location by amplitude and phase measurement. 3,588,802, Cl. 340-15.5

Lescher, Tommy G., to Hughes Aircraft Company. Low noise read winding. 3,588,854, Cl. 340-174.

Lesniewski, Robert J., to United States of America, National Aeronautics and Space Administration. Variable digital processor including a register for shifting and rotating bits in either direction. 3,588,483, Cl. 235-175.

Letzel, Karl: *See—*
Froitzheim, Hans; Letzel, Karl; and Bsirske, Leo, 3,588,168.

Leupold & Stevens Instruments, Inc.: *See—*
Lee, Harold G., 3,588,886.

Leuthold, Peter: *See—*
Tisi, Felix D.; and Leuthold, Peter, 3,588,702.

Levand, Victor A., Jr.; Thomasson, Gene I.; and Holcomb, Richard H., to General Electric Company. Quartz-to-metal seal. 3,588,315, Cl. 174-50.64

Levin, Berton P., to Sierracin Corporation, The. Method of shielding of fluorescent lighting fixtures. 3,587,167, Cl. 29-592.

Levin, Herman, to Bell & Howell Company. Magnetic clutch projector drive system. 3,588,558, Cl. 310-93.

Levine, Louis: *See—*
Van Der Sluys, Peter C.; Ellis, George E.; Levine, Louis; and Modrow, Fred P., 3,588,658.

Le Von, Mihran, Jr. Time fee computer. 3,588,450, Cl. 235-61.8

Lewis, E. R. Rock polisher. 3,587,193, Cl. 51-163.

Lewis Engineering Company: *See—*
Horwinski, Elwood R., 3,588,776.

Lewis, Orrin E. Engine ignition tester including an ignition coil polarity indicator. 3,588,679, Cl. 324-17.

Lewis, Robin B., to Jamesbury Corporation. Fail safe mechanism for reversible motors. 3,588,652, Cl. 318-282.

Leyland Gas Turbines Limited: *See—*
Barnard, Mark Cary Sedgwick, 3,588,289.

Lherault, Jean Andre, to Societe Industrielle Pour la Diffusion d'Equipment et de Material 'Sidemat'. Cartridge puncturing and dispensing apparatus. 3,587,926, Cl. 222-5.

Libbey-Owens-Ford Company: *See—*
Oelke, Waldemar W., 3,587,956.

Licentia Patent-Verwaltungs-GmbH: *See—*
Heine, Gunter; Droge, Carsten; Ludemann, Joseph; Koch, Ingo; and Christoffers, Elimar, 3,588,649.
Lambrecht, Dietrich; and Weghaupt, Erich, 3,587,638.

Lichtenstein, Eric S. Self-contained, moving needle syringe with hydraulic safety lock. 3,587,575, Cl. 128-215.

Liesegang, Gerhard, to LISEGA Rohrleitungszubehor G.m.b.H. Sprung pipe support. 3,588,010, Cl. 248-54.

Liestmann, Wolf-Dietrich: *See—*
Schrewe, Hans; Kobusch, Helmut; Liestmann, Wolf-Dietrich; Carius, Wolfhard; Vom Ende, Hans; Frenken, Klaus; and Vogt, Gerd, 3,587,719.

Linardos, Stathis G.; Elmhurst, Richard F.; and Elmhurst, William A., to Lykes Bros. Incorporated, Systems & Engineering Division. Depth indicator. 3,588,795, Cl. 340-3.

Lincoln AG-Products, Inc.: *See—*
Wainscott, Dain D., 3,587,516.

Lindahl, Carl-Axel; Ohlsen, Bengt Ludvig; and Hjort, Lars Ake Valdemar, to Aktiebolaget Karlstads Mekaniska Werkstad. Method apparatus for variable pitch propellers. 3,588,272, Cl. 416-1.

Linde Aktiengesellschaft: *See—*
Kratzenberg, Dietrich, 3,587,404.

Linder, Derek: *See—*
Dobbs, David John Miller; and Linder, Derek, 3,588,441.

Lindsey, James M., to Sperry Sun Well Surveying Company. Borehole instrument. 3,588,908, Cl. 346-33.

Lindstrom, Gary: *See—*
Sorkin, Morris; and Lindstrom, Gary, 3,588,703.

Ling, Andrew T., to Compagnie Internationale Pour l'Informatique. Associative memory. 3,588,845, Cl. 340-173.

Lingmann, Orson R.; and Gold, Milton O., to Kennecott Copper Corporation. Tramp metal detection system with belt splice avoidance for conveyors. 3,588,686, Cl. 324-41.

Link, Robert O.; and Morse, George W. Wire cutting tool. 3,587,172, Cl. 30-246.

Linker, Roy E. Electrically heated windshield wiper assembly. 3,587,129, Cl. 15-250.06

Linson Instrument Aktiebolag: *See—*
Ohlin, Lars Erik; Lofvenmark, Jan Olof; and Carlsson, Gosta, 3,587,676.

Linton, Richard H.; and Sonoda, George Y., to International Business Machines Corporation. Storage cell with variable power level. 3,588,846, Cl. 340-173.

Lipe, Bruce R.: *See—*
Koehlke, Earl L.; Lipe, Bruce R.; and Schroeder, Earle E., 3,588,009.

Lipp, James: *See—*
Cobb, Richard O.; and Lipp, James, 3,588,820.

LISEGA Rohrleitungszubehor G.m.b.H.: *See—*
Liesegang, Gerhard, 3,588,010.

Litofsky, Barry, to Bell Telephone Laboratories, Incorporated. Multidigit code translator. 3,588,879, Cl. 340-347.

Littwin, Arthur K. Solid state electrical control for a reversible movable member. 3,588,651, Cl. 318-266.

Liu, Chao N.: *See—*
Chow, Chao K.; and Liu, Chao N., 3,588,823.

Ljungberg, Sten Herman; and Sternhoff, Bror Lennart Teodor, to Nitro Nobel AB. Apparatus for kneading doughy explosives. 3,588,054, Cl. 259-4.

Llop, Helenio, to Societe d'Optique, Precision, Electronique et Mecanique 'Sopelem'. Automatic camera diaphragm system. 3,587,420, Cl. 95-10.

Lloyd, Donald, to Gulf Coast Pipe Inspectors, Inc. Method and apparatus for non-distructive testing of ferromagnetic articles to determine the location, orientation and depth of defects in such articles utilizing the Barkhausen effect. 3,588,683, Cl. 324-37.

Lloyd, Harold L. Top-fired ingot soaking pit and cover therefor. 3,588,062, Cl. 263-40.

Loader, Jesse, to Hymatic Engineering Company Limited, The. Relating to butterfly valves. 3,587,631, Cl. 137-527.

Lobdell, Stephen L.; and Gamble, Ralph S., to Simmonds Precision Products, Inc. Pressure transducer mounting. 3,587,322, Cl. 73-420.

Loch, Frank J.: *See—*
United States of America, National Aeronautics and Space Administration, Administrator, 3,588,705.

Lockheed Aircraft Corporation: *See—*
Gamaunt, Roger L., 3,587,767.

Lockie, Arthur M., to Westinghouse Electric Corporation. Impedance checking apparatus for shielded electrical systems. 3,588,688, Cl. 324-51.

Loewenstein, Paul, to Whittaker Corporation. Extrusion cut-off. 3,587,282, Cl. 72-273.

Lofvenmark, Jan Olof: *See—*
Ohlin, Lars Erik; Lofvenmark, Jan Olof; and Carlsson, Gosta, 3,587,676.

Logan, David Jopson; Webster, Ronald B.; Pavone, Robert Joseph; and Richardson, David Gilmer, Jr., to Gerber Scientific Instrument Company, The. Wire holding comb. 3,588,081, Cl. 269-40.

Lohneis, Earl R., to Kearney & Trecker Corporation. Tool change mechanism for a machine tool. 3,587,873, Cl. 214-1.

Lohneis, Earl R.; and Stobbe, Richard E., to Kearney & Trecker Corporation. Index and table drive means for a machine tool. 3,587,390, Cl. 90-58.

Losey, Jerry E., to Cincinnati Milacron Inc. Method and apparatus for controlling electrical discharge machining power supply. 3,588,613, Cl. 317-33.

Lott, Lewis E.: *See—*
Reikes, Dan; Grimes, James G.; Hale, Carl R.; and Lott, Lewis E., 3,587,576.

Lotter, John G. Vehicle speed control system. 3,587,769, Cl. 180-98.

Louboutin, Herve Jean Pierre Marie: *See—*
Chaltelon, Andre Edouard Joseph; Lerouge, Claude Paul Henry; and Louboutin, Herve Jean Pierre Marie, 3,588,876.

Louden, William C.: *See—*
McVey, Charles I.; and Louden, William C., 3,588,577.

Lowel, Fritz: *See—*
Keller, Hans; and Lowel, Fritz, 3,588,721.

Lowrey, Robert Dean; and Huffman, William A., to Minnesota Mining and Manufacturing Company. Thermographic process for the manufacture of projection transparencies and materials therefor. 3,588,501, Cl. 250-65.

LTV Electrosystems, Inc.: *See—*
Holmes, Lloyd H., 3,587,405.

Luc-Belmont, Stephane: *See—*
Theobald, Reiner; and Luc-Belmont, Stephane, 3,587,915.

Lucas, Alvin S. Power valve arrangement. 3,588,058, Cl. 261-67.

Lucas, Joseph, (Industries) Limited: *See—*
Ball, Albert Herbert, 3,588,421.
Prickett, Alfred Donald, 3,588,414.
Prickett, Alfred Donald, 3,588,811.
Skinner, Robert T. J., 3,588,286.

Lucas, Joseph, (Industries) Limited: *See—*
Bloom, Joseph Lewis, 3,588,035.

Ludemann, Joseph: *See—*
Heine, Gunter; Droge, Carsten; Ludemann, Joseph; Koch, Ingo; and Christoffers, Elimar, 3,588,649.

Luebrecht, Richard E., to Westinghouse Electric Corporation. Automatic paralleling system. 3,588,519, Cl. 307-87.

Luger, Robert T. Self-erasing, short-time memory data recorder. 3,588,907, Cl. 346-1.

Luke, Robert R.; Robinson, Marshall M.; and Thomson, Kenneth, to Shell Oil Company. Display system for seismic data. 3,588,911, Cl. 346-74.

Lukes, Joseph A.: *See—*
Osborne, Thomas E.; Magleby, Kay B.; and Lukes, Joseph A.,3,588,873.

Luna, Agostino; and Cafissi, Roberto, to GTE Automatic Electric Laboratories Incorporated. Wideband solid state frequency modulator with linear characteristics. 3,588,746, Cl. 332-14.

Lundell, Raymond C.: *See—*
Olson, Albert Kenneth; and Lundell, Raymond C.,3,587,377.

Lunt, Judith Lee, 80% to Barber, C. Richard, and 20% to Winn, Charles S. Windshield protector. 3,588,169, Cl. 296-95.

Lusted, Dean, to Massachusetts Institute of Technology. Polarized light binocular microscope. 3,588,219, Cl. 350-14.

Luthi, Oscar, to Improved Machinery, Inc. Press having adjustable platen loading. 3,587,451, Cl. 100-118.

Lykes Bros. Incorporated, Systems & Engineering Division: *See—*
Linardos, Stathis G.; Elmhurst, Richard F.; and Elmhurst, William A.,3,588,795.

Lyman, Richard E., to United States Steel Corporation. Apparatus for desulfurizing ferrous metal. 3,588,069, Cl. 266-34.

Lynch, Walter L., Jr.: *See—*
Stone, Eugene E., III; Lynch, Walter L., Jr.; and Barron, Roger D.,3,588,091.

Lynes, Dennis J.; Shichman, Harold; and Waaben, Sigurd G., to Bell Telephone Laboratories Incorporated. Digit line coupling circuits for digital stores. 3,588,849, Cl. 340-174.

Lyon Metal Products, Incorporated: *See—*
Stewart, Edward C.; and Walter, Florian A., 3,588,198.

Macano, Samuel J.: *See—*
Shook, Carl G.; Anderson, Robert F.; and Macano, Samuel J.,3,588,825.

Machinery Automation Research Corporation: *See—*
Timby, Ronald L., 3,587,496.

Macks, Fred: *See—*
Gold, Harold; and Macks, Fred,3,587,701.

Mac Lean, Gerald K.; and Pekosh, Raymond J., to Zenith Radio Corporation. Segmented electron shield for color picture tube. 3,588,567, Cl. 313-85.

Mader, Joseph L.: *See—*
Avignon, Michel L.; and Mader, Joseph L.,3,588,878.

Madsen, Lorrin H., to American Rehabilitation Foundation, Inc. Drop seat. 3,587,569, Cl. 128-33.

Magaribuchi, Kazuo: *See—*
Okamoto, Harumichi; Shikata, Toshio; and Magaribuchi, Kazuo,3,588,028.

Magerkurth, Knute W.: *See—*
Guraydin, Orhan A.; and Magerkurth, Knute W.,3,588,410.

Magleby, Kay B.: *See—*
Osborne, Thomas E.; Magleby, Kay B.; and Lukes, Joseph A.,3,588,873.

Magline, Inc.: *See—*
McLeese, Royal R.; and Mortenson, Carl N., 3,587,125.

Magnavox Company, The: *See—*
Okleshen, Ernest John, 3,588,337.

Magnuson, Everett E., to Eclipse Lookout Co. Boiler shell assembly. 3,587,531, Cl. 122-156.

Maher, John P.: *See—*
Fabricius, John H.; and Maher, John P.,3,588,642.

Mahncke, Heinz; and Valbjorn, Knud Vagn, to Danfoss A/S. Motor-compressor. 3,587,343, Cl. 74-603.

Maier, Cletus E., to General Electric Company. Method for making electric discharge device. 3,587,147, Cl. 29-25.15

Makuch, John A.; and Brown, Richard D., to Combustion Engineering, Inc. Coal slurry feed system. 3,587,487, Cl. 110-7.

Mallindine, James L. Paint roller. 3,588,264, Cl. 401-197.

Malmer, Michael M., Jr.: *See—*
Pedersen, John H.; Malmer, Michael M., Jr.; Hebeler, Charles B.; and Chang, Hoy Ying,3,588,834.

Mamoru Matsuoka: *See—*
Miura, Kosaburo, 3,588,116.

Mankowski, Louis F., Jr.; and Mills, Jeffrey P., to GTE Automatic Electric Laboratories, Incorporated. D.C. cable driver circuit free from voltage variations between separated grounds. 3,588,622, Cl. 317-148.5

Mannesmann Aktiengesellschaft: *See—*
Schrewe, Hans; Kobusch, Helmut; Liestmann, Wolf-Dietrich; Carius, Wolfhard; Vom Ende, Hans; Frenken, Klaus; and Vogt, Gerd, 3,587,719.

Mannesmann-Meer Aktiengesellschaft: *See—*
Hermes, Rofl, 3,587,136.

Mannik, Kallis H.: *See—*
Kreckel, Kurt H.; and Mannik, Kallis H.,3,588,462.

Manship, Roger Alan: *See—*
Mc Neilly, Joseph Hood; and Manship, Roger Alan,3,588,365.

Manship, Roger Alan, to International Standard Electric Corporation. Variable delay circuit. 3,588,707, Cl. 328-55.

Marathan Electric Research of Canada Ltd.: *See—*
Duff, David L.; and Dewan, Shashi B., 3,588,667.

Marathon Oil Company: *See—*
Tosch, William C., 3,587,737.

Marcucci, Richard: *See—*
Gualtieri, Salvatore; Marcucci, Richard; and Marcucci, Romolo,3,587,128.

Marcucci, Romolo: *See—*
Gualtieri, Salvatore; Marcucci, Richard; and Marcucci, Romolo,3,587,128.

Marenco, Mario, to Nuova San Giorgio S.p.A. Device for orderly arranging cops and spool cores for textile machines. 3,587,804, Cl. 193-43.

Marie, Jerard, to U.S. Philips Corporation, mesne. Colour image projectors. 3,588,324, Cl. 178-5.4

Mark, John W.; and Barney, Howard H., to United States of America, Atomic Energy Commission. Electro-fluid valve having strip electrodes. 3,587,613, Cl. 137-81.5

Markarian, Mark, to Sprague Electric Company. Leadless solid electrolyte tantalum capacitor. 3,588,627, Cl. 317-230.

Marks, Richard L.: *See—*
Hile, Clark Vinton; Marks, Richard L.; and Headington, Edward E.,3,588,030.

Marsalek, Milan: *See—*
Ripka, Josef; Junek, Jan; Marsalek, Milan; and Hortlik, Frantisek,3,587,219.

Marshall, Carroll W.: *See—*
Halley, Robert; Bolam, Robert J.; and Marshall, Carroll W.,3,588,693.

Marston Excelsior Limited: *See—*
Jennings, Geoffrey Charles; and Grosvenor, Ronald Leslie, 3,587,914.

Martin, Anthony J.: *See—*
Porath, Gordon H.; and Martin, Anthony J.,3,587,370.

Martin, Bill G., to Combustion Engineering, Inc. Method and means for inducing draft in a stack. 3,587,490, Cl. 110-162.

Martin, Carl L., to Leach Corporation, mesne. Multi-channel tape recorder with double recording prevention means. 3,588,375, Cl. 179-100.2

Martin, David F., to RCA Corporation. Method and apparatus for manufacturing magnetic recording tape. 3,588,771, Cl. 335-284.

Martin, Georges: *See—*
Hennart, Claude; Martin, Georges; and Balland, Jean Claude,3,587,968.

Martin, John A.: *See—*
Dahlem, Billy J.; and Martin, John A.,3,587,876.

Martin, Philip C.: *See—*
Kellogg, Robert C.; and Martin, Philip C.,3,507,916.

Martin, Thomas B., to RCA Corporation. Speech synthesizer utilizing timewise truncation of adjacent phonemes to provide smooth formant transition. 3,588,353, Cl. 179-1.

Martin, Thomas Brooks: *See—*
Herscher, Marvin Bernard; and Martin, Thomas Brooks,3,588,363.

Martindale, Allan; Allanson, John T.; and Parr, Bryan R., to Simon-Carves Limited. Desalination. 3,587,240, Cl. 62-58.

Marvin, William H., to Western Electric Company, Incorporated. Demagnetizing circuit. 3,588,624, Cl. 317-157.5

Maschinenfabrik Koppern & Co., KG: *See—*
Hilbrands, Jan Willem, 3,587,394.

Maschinenfabrik Lorenz AG: *See—*
Ditschler, Hans J., 3,587,384.

Masel, Marvin: *See—*
Gross, Robert D.; Masel, Marvin; and Scholl, Peter K.,3,588,880.

Mason, Jimmie L.: *See—*
Prussin, Samuel; and Mason, Jimmie L.,3,587,941.

Massachusetts Institute of Technology: *See—*
Howland, Bradford, 3,587,335.
Lusted, Dean, 3,588,219.

Massie, Philip E. Axial gear train. 3,587,349, Cl. 74-800.

Master Specialties Company: *See—*
Lane, Joseph J., 3,587,186.
Walker, Frank A., Jr., 3,587,184.

Masters, Harvey M., to Westinghouse Electric Corporation. Digital phase detection circuitry. 3,588,710, Cl. 328-133.

Mastromatteo, Frank J., to Duriron Company, Inc., The. Ring seal assembly. 3,588,125, Cl. 277-26.

Masuda, Takao: *See—*
Kimberley, John A.; Hussey, Russell B.; Inoue, Takashi; Masuda, Takao; and Harada, Takeshi,3,587,535.

Masui, Hideo: *See—*
Honda, Soichiro; and Masui, Hideo,3,588,141.

Mathisen, Einar S., to International Business Machines Corporation. Coherent optical noise suppression apparatus. 3,588,217, Cl. 350-3.5

Matsuda, Toshiyuki, to Honeywell Inc.Composite transistor circuit having a controllable VG2T2 BE. 3,588,550, Cl. 307-313.

Matsuda, Yuzo: *See—*
Sawada, Kunio; Matsuda, Yuzo; and Kuwabara, Hiroshi,3,588,755.

Matsumoto, Ken; and Hamabe, Ichizo, to Kawasaki Jukogyo Kabushiki Kaisha. Cooling apparatus for a converter body. 3,588,072, Cl. 266-36.

Matsuno, Hiromitsu: *See—*
Yamamoto, Manabu; Murayama, Seiichi; and Matsuno, Hiromitsu,3,588,594.

Matsushima, Takao, to Nippon Electric Company, Limited. Regenerative repeatered transmission apparatus. 3,588,715, Cl. 328-164.

Matsushita Electric Industrial Co., Ltd.: *See—*
Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi, 3,588,243.
Sakai, Yasuhide; Takagi, Yoshinori; and Atanabe, Masahiro, 3,588,706.
Sato, Hosei, 3,588,389.
Tanaka, Tamotsu; and Hara, Syozi, 3,587,923.
Uno, Yoshihiro, 3,588,587.
Yamauchi, Shinya; and Morita, Minoru, 3,587,717.

Matsushita Electronics Corporation: *See—*
Numata, Tsuneo, 3,588,588.

Mattel, Howard. Air inflated collapsible suitcase. 3,587,794, Cl. 190-43.

Matthew Hall Mechanical Services Limited: *See—*
Venison, Douglas Michael; and Allen, George, 3,587,746.

Mauer, Albin J. Rim guard. 3,587,700, Cl. 150-52.

Maxon Premix Burner Company, Inc.: *See—*
Brenneman, George B.; and Coppin, William P., Jr., 3,588,301.

Maxwell, Richard F., Jr.; and Kaisler, Francis J., to Westinghouse Electric Corporation. Optical scanning system having a detector disposed at the center of curvature of a spherical focal surface. 3,588,517, Cl. 250-233.

May, Kenneth Devere: *See—*
Huston, James Anthony; Belden, Robert Wayne; and May, Kenneth Devere,3,588,090.

May, Larry A.: *See—*
Romanowski, Albert F.; May, Larry A.; and Hays, Norman W.,3,587,808.

Mayer, Oscar, & Co., Inc.: *See—*
Brassington, Earl; Balch, James L.; and Hornagold, Harry V., 3,587,691.

Mazak, Laszlo. Chair. 3,588,013, Cl. 248-158.

MC-Y & M Co. Inc.: *See—*
Mc Corrison, George E., 3,588,048.

Mc Allister, Lewis L.: *See—*
Pitts, Robert D.; and Mc Allister, Lewis L.,3,587,391.

Mc Bride, Richard A.; Herbert, Reginald S.; and Weintraub, Warren S., to Varian Associates. Square wave symmetry control circuit for use in magnetometer readout circuits. 3,588,708, Cl. 328-58.

McCarthy, Donal Edward. Disposable integral bottle and stacking cases. 3,587,910, Cl. 220-23.4

Mc Carthy, Joseph A., to Westinghouse Electric Corporation. Method and apparatus for steering strip material through rolling mills. 3,587,263, Cl. 72-8.

McCash, Robert M.; and Dever, Lewis A., to Cincinnati Milacron Inc. Machine tool. 3,587,359, Cl. 77-3.

McCauley, Patrick H.: *See—*
Husband, Max R., 3,588,470.

McCloskey, Edward W. Apparatus for detecting and locating a fire and for producing at least one corresponding intelligence-carrying output signal. 3,588,893, Cl. 340-418.

McCollough, William E.; and Herman, Ronald E., to Holley Carburetor Company. Multi-stage power valve assembly. 3,587,651, Cl. 137-628.

McCord, Wilfred M., Jr.: *See—*
Cowley, William E.; and McCord, Wilfred M., Jr.,3,587,626.

McCormack, Thomas L.; Morin, Maurice A.; and Staffiere, Donald T., to Cambridge Memory Systems, Inc., mesne. Memory assembly. 3,588,852, Cl. 340-174.

Mc Corrison, George E., to MC-Y & M Co. Inc. Jack for tractor drawn trailers and the like. 3,588,048, Cl. 254-94.

McCourtie, Grace E. Head covering. 3,587,114, Cl. 2-207.

McCoy, William J., Jr.: *See—*
Ellis, Gus M., Jr.; and McCoy, William J., Jr.,3,588,177.

Mc Cready, Ross B.; and Forster, Klaus W., to Alliance Machine Company, The, mesne. Apparatus for making steel. 3,588,073, Cl. 266-39.

Mc Cusker, Joseph H.: *See—*
Perlman, Stuart S.; and Mc Cusker, Joseph H.,3,588,551.

Mc Donald, William G.: *See—*
Thomas, Raymond J.; Mc Donald, William G.; and Dunning, Walter B.,3,587,412.

McEwen, Norman S.; and Fishe, Gerald R. A. Combination paper dispenser and exhaust ventilator. 3,587,437, Cl. 98-1.

Mc Farland, James W.; and Miller, Wendell E., to Cessna Aircraft Company. Acceleration control for hydraulic transmissions. 3,587,765, Cl. 180-66.

Mc Farland, John, to Imperial Chemical Industries Limited. Pressure vessel. 3,587,905, Cl. 220-3.

McGinnis, Ralph E., to Westinghouse Electric Corporation. Shrouded rotor blade structure. 3,588,279, Cl. 416-191.

McGinty, Harry C.: *See—*
Saenger, John F., Jr.; Enis, Allan; and McGinty, Harry C.,3,588,464.

Mc Gough, Wayne L.: *See—*
Keller, Robert A.; Mc Gough, Wayne L.; and Sutton, Henry C., Jr.,3,587,243.

McGraw-Edison Company: *See—*
Clinkenbeard, Charles R., 3,588,578.
Gersch, Richard G.; and Hoag, Kip J., 3,588,212.
Nash, William H.; Lapp, John; and Sadler, Fred S., 3,588,644.

McGregor, Eugene R., to Universal Oil Products Company. Reclining seat. 3,588,172, Cl. 297-355.

McGroddy, James C., to International Business Machines Corporation. Three-terminal bulk negative resistance device operable in oscillatory and bistable modes. 3,588,736, Cl. 331-47.

McIntosh, Duane E., to General Motors Corporation. System for reconstructing a digital signal. 3,588,714, Cl. 328-164.

McKee, William H., to United-Carr Incorporated. Ground bushing. 3,588,782, Cl. 339-14.

McKillop, George R.; Tankus, Harry; and Thayer, James H., to Crane Packing Company. Unit type packing seal for shaft. 3,588,126, Cl. 277-32.

McKinney, Donald W.; and Sinski, Henry A., to Bancroft, Joseph, & Sons Co. Crimping apparatus with heating and cooling gage. 3,587,145, Cl. 28-1.7

McLauchlan, A. B., Co., Inc.: *See—*
Dixon, Robert G., 3,587,686.

Mc Laughlin, Frank C.: *See—*
Hyland, John E.; and Mc Laughlin, Frank C.,3,587,890.

McLeese, Royal R.; and Mortenson, Carl N., to Magline, Inc. Sectional spanning beam and end supports. 3,587,125, Cl. 14-6.

Mc Murtrie, Charles L.; and Rodely, Alan E., to Eastech, Inc. Differential sensor bluff body flowmeter. 3,587,312, Cl. 73-204.

Mc Nabb, Rex P. Document carrier envelope. 3,588,456, Cl. 235-61.12

McNaughton, Douglas L.: *See—*
Ireland, Graham A.; and McNaughton, Douglas L.,3,587,320.

Mc Neilly, Joseph Hood; and Manship, Roger Alan, to International Standard Electric Corporation. Subscriber subset for PCM teephone system. 3,588,365, Cl. 179-15.

Mc Queen, John; and Minutillo, Leonard D., to Griffiths Electronics Inc. Focusing electrode with bent support arms to reduce high voltage arcing. 3,588,569, Cl. 313-85.

Mc Queen, Malcolm M. Electro-hydraulic mechanical actuator. 3,587,234, Cl. 60-52.

McVey, Charles I.; and Louden, William C., to General Electric Company. Calcia alumina magnesia baria seal composition. 3,588,577, Cl. 313-317.

Mead Corporation, The: *See—*
Van Brimer, Russell H.; and Culp, Fred E., 3,588,906.

Mecanada Limited: *See—*
Chamberland, Jean Thomas, 3,587,799.

Mechanical Technology Incorporated: *See—*
Curwen, Peter W.; and Newell, Richard V., 3,588,291.

Mechling, Eli H. Multi-section mold with air pressure ejection ring. 3,587,144, Cl. 25-118.

Meckler, Edgar, to Bruninghaus & Co. Bezett KG. Apparatus for applying locking sleeves to tying material. 3,587,449, Cl. 100-30.

Medical Supply Company: *See—*
Avery, Carl F., Jr.; Pearson, Ernest A.; and Winters, Lloyd V., 3,587,920.

Medinova Aktiebolag: *See—*
Jacobson, Nils B.; and Bolmgren, Jan R., 3,588,235.

Medley, Walter S.: *See—*
Mohr, Robert A.; and Medley, Walter S.,3,587,621.

Medwin, Albert H., to RCA Corporation. Integrated circuit. 3,588,635, Cl. 317-235.

Mefina S.A.: *See—*
Fresard, Marcel; and Plomb, Francis, 3,587,500.

Meidensha Electric Mfg. Co., Ltd.: *See—*
Suzuki, Shiro, 3,588,675.

Meinch, William G. Automatic tube loader. 3,587,672, Cl. 141-67.

Meisoll, Robert F.; and Moss, Edgar L., Jr., to American Machine & Foundry Company. Device to maintain constant tension on dual slice blade. 3,587,379, Cl. 83-201.10

Mellor, Wendell J.: *See—*
Stewart, Mark C., 3,588,098.

Meloni, Mario, to Autelca AG. Coin tester with slotted coin guide duct. 3,587,809, Cl. 194-100.

Menard, Roger. Milling cutter. 3,587,150, Cl. 29-105.

Mengual, Enrique Carbo. Valve for servo-steering devices. 3,587,645, Cl. 137-625.61

Menke, Helmut; and Florin, Hans, to Dynamit Nobel AG. Delayed action detonator. 3,587,467, Cl. 102-28.

Mercer, Frank B., to Netlon (p.T.a.) Limited. Plastics extrusion dies and method of their manufacture. 3,587,357, Cl. 76-107.

Mercer, James B. Hyperbaric treatment chamber. 3,587,574, Cl. 128-204.

Mercier, Jacques, to Regie Nationale des Usines Renault, and Automobiles Peugeot. Automotive air-vent automatic control systems. 3,587,439, Cl. 98-2.

Merren, Thomas Oliver: *See—*
Halliday, John Stephen; Merren, Thomas Oliver; and Heath, John Stewart,3,588,495.

Merriam, Layton C.; and Davis, Austin L., to Howe Richardson Scale Company. Load cell force transmitting assembly for vehicle weighing scales and the like. 3,587,761, Cl. 177-134.

Mertens, Pierre, to Ateliers de Constructions Electriques de Charleroi (ACEC). Process and apparatus for measuring the distance travelled by a remote controlled vehicle. 3,588,494, Cl. 246-63.

Mestrovic, Robert. Linear clock. 3,587,222, Cl. 58-2.

Metaframe Corporation: *See—*
Willinger, Allan H., 3,588,153.

Metal Signs and Nameplates (Proprietary) Limited: *See—*
Rowland-Jones, Henry E., 3,587,380.

Metropolitan Waste Conversion Corporation: *See—*
Anderson, Ingvar G., 3,587,851.

Meulendyk, John W.; and Vanderlaan, Robert D., to Pneumo Dynamics Corporation. Combination bypass and relief valve. 3,587,963, Cl. 236-92.

Meyer & Wenthe, Inc.: *See—*
Meyer, John W.; and Steiner, Ralph J., 3,587,454.

Meyer, Dietrich, to U.S. Philips Corporation, mesne. Arrangement for forming the quotient of two frequencies. 3,588,473, Cl. 235-92.

Meyer, Herbert, to U.S. Philips Corporation, mesne. Digital optical modulator. 3,588,749, Cl. 350-151.

Meyer, John W.; and Steiner, Ralph J., to Meyer & Wenthe, Inc. Seal press die mounting. 3,587,454, Cl. 101-3.

Meyer, Louis C. Container for holding magnetic tape on edge and handling device therefor. 3,588,377, Cl. 179-100.2

Meyer, Paul J. Warning light for appliances. 3,588,861, Cl. 340-252.

Meyers, Phillip H.: *See—*
Reikes, Dan; Grimes, James G.; Hale, Carl R.; and Lott, Lewis E., 3,587,576.

Michael, Jacob F., to Westinghouse Electric Corporation. Electric lamp filament having a coiled-coil body portion with oriented off-set legs, and method of manufacture. 3,588,579, Cl. 313-344.

Michalski, Maksymilian A., to Berkey Photo, Inc. Electric system for starting and operating a gas discharge lamp. 3,588,599, Cl. 315-200.

Micro Magnetic Industries: *See—*
DiOrio, Anthony N., 3,587,924.

Midland-Ross Corporation: *See—*
Ingram, Orville, 3,587,476.

Midwest Research & Development Corporation: *See—*
Wood, Charles P., Jr., 3,587,244.

Mikulec, Conrad S.: *See—*
Romero, Max A.; and Mikulec, Conrad S.,3,587,747.

Mil Engineering & Machinery Co.: *See—*
Alciati, Charles J., 3,587,986.

Milcoy, Edgar A. P., to Arrow-Hart Inc. Power tool switch and speed control with control elements mounted in recesses in the tool handle. 3,588,411, Cl. 200-157.

Miles, Cecil W., to Green Bay Research Corporation. Unitary engine vapor recycling device. 3,587,542, Cl. 123-119.

Miles, Cecil W., to Green Bay Research Corporation. Engine vapor recycling device with internal temperature regulation. 3,587,544, Cl. 123-119.

Miles, Francis E. Apparatus for preparing salad mixes. 3,587,203, Cl. 53-112.

Milestone, Inc.: *See—*
Brown, Scott W.; and Ward, Owen K., 3,587,854.

Milianowicz, Stanislaw A.: *See—*
Frink, Russell E.; and Milianowicz, Stanislaw A.,3,588,407.

Millam, Gerald J., to Honeywell Inc. Taut wire moving contact mounting arrangement. 3,588,416, Cl. 200-166.

Millar, Alexander E. J.; Shaver, William W.; and Mrotzek, Richard, to Pacific Containers Ltd. Demountable container. 3,587,900, Cl. 217-12.

Millard, Richard J.; Larson, Warren A.; and Thompson, David G., to Sprague Electric Company. Electrolytic capacitor with support members as terminals. 3,588,629, Cl. 317-230.

Miller, David S.; Fresia, Elmo James; and Cooper, Alan G., to Sprague Electric Company. Non-polar feed-through capacitor. 3,588,631, Cl. 317-230.

Miller, David S.; Presia, Elmo James; and Cooper, Alan G., to Sprague Electric Company. Non-polar feed-through solid electrolyte capacitor. 3,588,630, Cl. 317-230.

Miller Electric Manufacturing Company: *See—*
Corrigall, Don J., 3,588,653.

Miller, James A.: *See—*
Buckingham, Arthur G.; Miller, James A.; and Shapiro, George,3,588,000.

Miller, Judson O. Flagpole. 3,587,520, Cl. 116-173.

Miller, Leon F.; and Herbruggen, Henry J., to Sherwin-Williams Company, The, mesne. Foundry sand forming method. 3,587,709, Cl. 164-12.

Miller, Lester F.: *See—*
Godel, Siegfried; and Miller, Lester F.,3,587,444.

Miller, Lowell E.: *See—*
Henderson, Robert M.; Miller, Lowell E.; and Zechlin, Richard,3,588,479.

Miller, Marvin: *See—*
Miller, Robert P.; Miller, Marvin; and Bailey, Stephen P.,3,588,581.

Miller, Robert P.; Miller, Marvin; and Bailey, Stephen P., to Sibany Manufacturing Corporation. Electric arc sun lamp. 3,588,581, Cl. 314-130.

Miller, Wendell E.: *See—*
Mc Farland, James W.; and Miller, Wendell E.,3,587,765.

Miller, William F., to Vetco Offshore Industries, Inc. Method of rotatably releasing a tubular running string from a floating drilling vessel. 3,587,733, Cl. 166-0.5

Mills, Edwin R.; and Elmore, Ernest L., to Fieldcrest Mills, Inc. Electrically heated bedcover and power modulating control circuits therefor. 3,588,446, Cl. 219-501.

Mills, Edwin R.; and Elmore, Ernest L., to Fieldcrest Mills, Inc. Electrically heated bedcover and power control circuit therefor. 3,588,447, Cl. 219-501.

Mills, Jeffrey P.: *See—*
Mankowski, Louis F., Jr.; and Mills, Jeffrey P.,3,588,622.

Milton, Robert M., to Union Carbide Corporation. Heat exchange system with porous boiling layer. 3,587,730, Cl. 165-110.

Miniovitch, Wladimir; and Chenin, Claude, to Sud-Aviation Societe Nationale de Constructions Aeronautiques. Articulation device for deployable appurtenances on spacecraft. 3,587,999, Cl. 244-1.

Minister of National Defense, Her Majesty the Queen in right of Canada: *See—*
Wallingford, Errol E.; and Morris, Ronald Bruce, 3,588,364.

Minnesota Mining and Manufacturing Company: *See—*
Good, Paul J., 3,587,428.
Lowrey, Robert Dean; and Huffman, William A., 3,588,501.
Olson, Albert Kenneth; and Lundell, Raymond C., 3,587,377.

Minolta Camera Co., Ltd.: *See—*
Yata, Kintaro, 3,587,433.

Minolta Camera Kabushiki Kaisha: *See—*
Kuramoto, Yoshio; and Umeda, Kaoru, 3,587,998.
Nitta, Yoshio, 3,587,427.
Noda, Koji, 3,588,247.

Mintz, Leon J.: *See—*
Block, Charles; and Mintz, Leon J.,3,587,947.

Minutillo, Leonard D.: *See—*
Mc Queen, John; and Minutillo, Leonard D.,3,588,569.

Mioc, Gualtiero: *See—*
Zaffignani, Giovanni; and Mioc, Gualtiero,3,588,646.

Mironov, Jack: *See—*
Tudor, Sidney; and Mironov, Jack,3,587,523.

Mitchell, James I., to Bendix Corporation, The. Shock absorbing means for a free pendulous magnetic azimuth detector mechanism. 3,588,001, Cl. 244-1.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Akamatsu, Masahiko, 3,588,664.
Hirata, Tsuyoshi, 3,588,663.
Okuda, Bunichi; Nobata, Akio; Ogawa, Noboru; Okabe, Isamu; Tsuruya, Yoshimasa; and Oosuga, Michitaka, 3,587,907.
Yanagishita, Kazuo; and Kano, Takanori, 3,588,509.

Mitsubishi Seiko Kabushiki Kaisha: *See—*
Akuta, Tomohiko; and Seya, Atsumi, 3,587,758.

Miura, Kosaburo, to Mamoru Matsuoka. Card shuffler. 3,588,116, Cl. 273-149.

Mix, Joseph E.: *See—*
Cox, John R.; and Mix, Joseph E.,3,587,124.

Miyamatsu, Yasunori; Hashimoto, Yuji; and Enari, Shoji, to Toyo Kohan Co., Ltd. Sink roll for supporting an elongate material without direct contact. 3,587,598, Cl. 134-122.

Miyashita, Tsuneo: *See—*
Shimotsuma, Teruo; Mori, Toshihiro; Sano, Kazuo; and Miyashita, Tsuneo,3,588,067.

Miyata, Yoshimasa, to Planny Kabushiki Kaisha (Planny, Ltd.). Packaging container. 3,587,838, Cl. 206-46.

Miyauchi, Eizo: *See—*
Nakayama, Norihiko; Tanaka, Minoru; and Miyauchi, Eizo,3,588,600.

Mizukami, Mineo: *See—*
Inaba, Masao; Nakumura, Harunobu; and Mizukami, Mineo,3,588,748.

Mobus, Gunter: *See—*
Westphal, Dieter; and Mobus, Gunter,3,588,553.

Modern Album and Finishing Co., Inc.: *See—*
Froehlig, Rudolph A., 3,587,848.

Modern Faucet Mfg. Co.: *See—*
Ward, Irving A., 3,587,117.
Ward, Irving A., 3,588,040.

Modrow, Fred P.: *See—*
Van Der Sluys, Peter C.; Ellis, George E.; Levine, Louis; and Modrow, Fred P.,3,588,658.

Moffett, John W. Aerating rotary filter sweep. 3,587,975, Cl. 239-428.5

Mohr, Robert A.; and Medley, Walter S., to Community Linen Rental Service. Automatic addition of liquid chemicals in laundries. 3,587,621, Cl. 137-209.

Moller, Joseph G. Clamp for eyeglass frames. 3,588,236, Cl. 351-158.

Molly, Hans. Power-branched hydrostatic vehicle transmission. 3,587,238, Cl. 60-53.

Monforts, A.: *See—*
Reiners, Franz; and Walk, Georg, 3,587,368.
Reiners, Franz; and Walk, Georg, 3,587,369.
Reiners, Franz; and Kamphausen, Erich, 3,588,088.

Monge, Antonio Camarasa. Weft thread selecting device for weaving machines with a fixed weft supply. 3,587,665, Cl. 139-122.

Monk, John, to Xerox Corporation. Selective binary encoding of video information signal. 3,588,329, Cl. 178-6.

Monogram Industries, Inc.: *See—*
Crump, Woodford J., 3,588,297.

Monsanto Chemicals Limited: *See—*
Halsey, Gordon, 3,587,713.

Monsanto Company: *See—*
Fricke, Louis H., Jr.; and Walsh, Robert A., 3,588,487.
Rogers, Lawrence W., 3,587,363.

Montagne, James R. Shutter arrangement for radiography. 3,588,511, Cl. 250-105.

Montanari, Piero. Hydropneumatic shock-absorber provided with elastic bellows separator of working fluids. 3,588,064, Cl. 267-64.

Montillon, Henry Aldrich: *See—*
Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin,3,588,085.

Montone, Liber J.; and Walls, Donald C., to Western Electric Company, Incorporated. Method and apparatus for aligning a mask and a substrate using infra-red radiation. 3,588,347, Cl. 178-6.8

Monty, Leo J., to Artisan Industries Inc. Thin film processing method. 3,587,704, Cl. 159-6.

Moojen, Lindsay Geoffrey. Writing implements. 3,588,261, Cl. 401-92.

Moon, Harry C., Jr., to Sunstrand Corporation. Hydraulic pump. 3,588,285, Cl. 417-202.

Moore, Edward J.; and Desai, Kantilal P., to Atlantic Richfield Company, mesne. Method of determining characteristics of earth formations. 3,588,800, Cl. 340-15.5

Moore, Larry R.; and Turek, Robert F., to Bowles Fluidics Corporation. Fluidic AC amplifiers. 3,587,604, Cl. 137-81.5

Moore, Robert G., Jr.: *See—*
Voight, Robert W.; and Moore, Robert G., Jr.,3,588,154.

Moore, Robert W.: *See—*
Blazek, Donald F.; Bury, Elmer J.; Moore, Robert W.; and Smith, Oliver J.,3,587,419.

Moore, Thomas M.: *See—*
Watters, Edward C., Jr.; and Moore, Thomas M.,3,588,898.

Morales, Juan Alberto. Concavo-convex siphoning pump. 3,588,293, Cl. 417-479.

Morbark Industries, Inc.: *See—*
Morey, Norval K.; and Smith, Leward N., 3,587,685.

Moreland, William C., II, to Westinghouse Electric Corporation. Self-cleaning cooking device. 3,587,556, Cl. 126-19.

Moret-Bailly, Jacques, to Centre National de la Recherche Scientifique (CHRS) Office National d'Etudes et de Recherches Aerospatiales. Spectrometer input or output devices. 3,588,251, Cl. 356-74.

Morey, Norval K.; and Smith, Leward N., to Morbark Industries, Inc. Apparatus and methods for debarking logs. 3,587,685, Cl. 144-311.

Morgan, William J.: *See—*
Figueroa, John W.; Morgan, William J.; and Rasmussen, Rolland R.,3,588,831.

Mori, Toshihiro: *See—*
Shimotsuma, Teruo; Mori, Toshihiro; Sano, Kazuo; and Miyashita, Tsuneo,3,588,067.

Morin, Maurice A.: *See—*
McCormack, Thomas L.; Morin, Maurice A.; and Staffiere, Donald T.,3,588,852.

Morin, Theodore Joseph: *See—*
Prevett, Peter Dominic; and Morin, Theodore Joseph,3,588,437.

Morita, Minoru: *See—*
Yamauchi, Shinya; and Morita, Minoru,3,587,717.

Morita, Takanobu: *See—*
Akamatsu, Hiroo; and Morita, Takanobu,3,588,513.

Moriyama, Ushimatsu: *See—*
Kihara, Yasukane; Moriyama, Ushimatsu; and Seta, Yoichi,3,588,625.

Morkovin, Nikolai Viktorovich: *See—*
Kleiman, Jury Lvovich; Morkovin, Nikolai Viktorovich; and Jurikov, Jury Nikolavevich,3,588,677.

Morris, Clifford Mandeville, to RCA Corporation. High voltage electron discharge tube. 3,588,575, Cl. 313-238.

Morris, Gwynfryn John; and Kirk, Michael Tayler, to Imperial Chemical Industries Limited. Yarn package. 3,587,996, Cl. 242-176.

Morris, John C., to Singer Company, The. Detent means for dater wheels. 3,587,457, Cl. 101-110.

Morris, John C.: *See—*
Klein, Richard G.; Thorson, Sheldon E.; and Morris, John C.,3,587,453.

Morris, Ronald Bruce: *See—*
Wallingford, Errol E.; and Morris, Ronald Bruce,3,588,364.

Morrow, John A. Multiple purpose hand tool. 3,587,121, Cl. 7-12.

Morse, George W.: *See—*
Link, Robert O.; and Morse, George W.,3,587,172.

Morse, Hugh B.: *See—*
Theys, Ezra E.; and Morse, Hugh B.,3,587,411.

Morse, James H., to Hughes Aircraft Company. Laser combination energy system. 3,588,440, Cl. 219-121.

Morse, John E., to Eastman Kodak Company. Integral processing tray and liquid container. 3,587,429, Cl. 95-95.

Mortenson, Carl N.: *See—*
McLeese, Royal R.; and Mortenson, Carl N.,3,587,125.

Moshier, Stephen; and Batteau, Dwight W., deceased0 (by Batteau, Blanca D.; executor), to United States of America, Navy, mesne. Vocal pulse detector. 3,588,356, Cl. 179-1.

Mosler Research Products, Inc.: *See—*
Hansen, Donald E., 3,588,865.

Moss, Edgar L., Jr.: *See—*
Meisoll, Robert F.; and Moss, Edgar L., Jr.,3,587,379.

Moss, Jack W., to Wichita Clutch Company, Inc. Power take-off with shaft free of radial load. 3,587,331, Cl. 74-11.

Mostel, Joseph, to United States of America, Navy. Precision adjustable assembly for an optical bench mark. 3,588,232, Cl. 350-288.

Motolese, Francesco: *See—*
Dal Monte, Giorgio; and Motolese, Francesco,3,588,371.

Motorola, Inc.: *See—*
Hansen, Robert B., 3,588,341.
Schafft, Hugo W., 3,588,381.
Schafft, Hugo W., 3,588,552.

Motz, Jerome C., to Nordberg Manufacturing Company. Segmented crusher liner. 3,587,987, Cl. 241-294.

Moulin, Jean, to Automobiles Peugeot. Fuel injection device for a compression-ignited internal combustion engine. 3,588,287, Cl. 417-275.

Moye, Laurence Stanley, to International Standard Electric Corporation. Echo suppression in long distance telephone circuits. 3,588,385, Cl. 179-170.2

Mrotzek, Richard: *See—*
Millar, Alexander E. J.; Shaver, William W.; and Mrotzek, Richard,3,587,900.

Mudrik, Josef: *See—*
Plechac, Bohuslav; and Mudrik, Josef,3,587,258.

Muehlenweg, Charles F. Device for use in reproducing characters on cylindrical surfaces. 3,587,388, Cl. 90-13.1

Mueller, Klaus P.: *See—*
Nisley, Larry V.; Mueller, Klaus P.; and Kreuter, Kenneth G.,3,587,395.

Mueller, Robert S., to Eaton Yale & Towne Inc. Anti-skid system. 3,588,187, Cl. 303-21.

Muller, Rolf: *See—*
Hofmann, Eberhard; Muller, Rolf; and Staudt, Heinrich,3,587,540.

Muller, Walter; and Fischer, Pius, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Indirectly acting compressed air brake dependent on the load. 3,588,194, Cl. 303-23.

Mundt, James E.; and Powell, Milan, to Weatherhead Company, The. Method of making a valve stem. 3,587,157, Cl. 29-157.1

Munters, Carl Georg: *See—*
Norback, Per Gunnar, 3,587,723.

Munton, Edward A., to Vigil Security Limited. Security container. 3,587,484, Cl. 109-25.

Murayama, Seiichi: *See—*
Yamamoto, Manabu; Murayama, Seiichi; and Matsuno, Hiromitsu,3,588,594.

Murdter, Gerhard, to Pfaff, G. M., AG. Arrangement on sewing machines for severing the thread chain. 3,587,499, Cl. 112-252.

Murgas, Karl M.; Greenberg, Burton; and Clark, Otto A., to ICP, Inc. Book copier attachment for a photocopy machine. 3,588,244, Cl. 355-8.

Murley, Ellsworth M., Jr., to Owens-Illinois, Inc. High power square wave sustaining generator for capacitive load gas discharge panels. 3,588,597, Cl. 315-169.

Murr, William C., to Bio-Engineering, Inc. Cervix dilating instrument and method. 3,587,588, Cl. 128-341.

Murray, Glenn W., to North American Rockwell Corporation. System for producing analog signals proportional to the anisotrophy field for plated wire. 3,588,681, Cl. 324-34.

Murray, Robert Maclay, to AMP Incorporated. Electrical connector, method and apparatus. 3,587,502, Cl. 113-1.

Mutke, Reinhold; and Steller, Peter, to Vereinigte Kesselwerke Aktiengesellschaft. Process and apparatus for the combined disposal of rubbish and sewage. 3,587,488, Cl. 110-7.

Myring, Verne Vincent: *See—*
Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin,3,588,085.

Nadella S.A.: *See—*
Pitner, Alfred, 3,588,129.

Nagel, Martin J.: *See—*
Bauer, Douglas M.; and Nagel, Martin J.,3,588,856.

Nagy, Ernest J., to Pullman Incorporated. End cap and locking mechanism for pneumatic discharge arrangement. 3,588,181, Cl. 302-52.

Nakamima, Nofuhito: *See—*
Hirano, Isao; and Nakamima, Nofuhito,3,587,376.

Nakamura, Yosiro: *See—*
Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi,3,588,243.

Nakanishi, Tsunemoto, to Tamura Electric Works Limited. Read out counters. 3,588,474, Cl. 235-92.

Nakano, Yoshiaki; Okamoto, Atutosi; Taniguchi, Koichi; and Toyama, Koichi, to Nippon Denso Company Limited. Oil hydraulic pressure modulating device for use in an anti-skid means of automobiles. 3,588,190, Cl. 303-21.

Nakata, Josuke. Structurally reinforced semiconductor device. 3,588,632, Cl. 317-234.

Nakayama, Norihiko; Tanaka, Minoru; and Miyauchi, Eizo, to Fujitsu Limited. Non-uniform crossed field electron gun for producing a stable electron beam orbit. 3,588,600, Cl. 315-326.

Nakazawa, Kisaburo: *See—*
Nishimoto, Tetsunori; Nakazawa, Kisaburo; Ishihara, Koichiro; and Horikoshi, Hisashi,3,588,484.

Nakumura, Harunobu: *See—*
Inaba, Masao; Nakumura, Harunobu; and Mizukami, Mineo,3,588,748.

Namiki, Torao. Duplex flowrate valve for pressurized fluids. 3,587,639, Cl. 137-595.

Nash Engineering Company: *See—*
Fitch, James B., 3,588,283.

Nash, William H.; Lapp, John; and Sadler, Fred S., to McGraw-Edison Company. Electrical apparatus and stabilized dielectric therefor. 3,588,644, Cl. 317-259.

Nast, Robert. Film feed apparatus. 3,587,436, Cl. 95-94.

Nathan, Leonard M. Folding counter construction. 3,588,209, Cl. 312-140.2

National Blank Book Company, Inc.: *See—*
Sibley, William J., 3,587,187.

National Cash Register Company, The: *See—*
Campbell, Hugh W., 3,587,982.
Congleton, David B.; Glazer, Sydney; and Armstrong, Melvin S., 3,588,818.

National Mine Service Company: *See—*
Freed, Donald L., Jr., 3,587,994.

National Research Development Corporation: *See—*
Alexander, John Malcolm; Lengyel, Bela; and Ashford, Peter Guy, 3,587,270.
Firth, Donald; and Cunningham, Sinclair Upton, 3,587,400.
Flower, John Walter, 3,587,770.
Laithwaite, Eric Roberts; and Bolton, Hugh Robert, 3,588,555.

Naumann, Erwin A., to Bendix Corporation, The. Fixed gain passive adaptive aircraft control system. 3,588,007, Cl. 244-77.

Nectoux, Andre, to Societe des Forges et Ateliers du Creusot. Traction installation for moving objects running along a horizontal plane. 3,588,049, Cl. 254-147.

Needham, Arthur Michael: *See—*
Tindall, David; and Needham, Arthur Michael,3,587,970.

Neely, Allan B., Jr. Bale stack loader for trucks. 3,587,883, Cl. 214-77.

Negley, Marvin C., to Electro-Voice, Incorporated. Headset incorporating a microphone and an earphone. 3,588,384, Cl. 179-156.

Negoro, Kaiji, to Whittaker Corporation, mesne. Tracer control mechanism. 3,588,033, Cl. 251-3.

Nelson, Arthur O., to New-Nel Kitchens Products Company. Vegetable shredder. 3,587,692, Cl. 146-160.

Nelson, Carl J., to Corning Glass Works. Saw blade with wavy edge for cutting and grinding glass ceramic tubing. 3,587,554, Cl. 125-15.

Nelson, Hilding E.: *See—*
Rash, Ross D.; Anderson, Duane H.; Nelson, Hilding E.; and Byrns, Paul D.,3,588,837.

Nelson, John H. Game boards with pattern changing means. 3,588,113, Cl. 273-130.

Nelson, Paul E., to International Business Machines Corporation. Mark read apparatus using small raster. 3,588,451, Cl. 235-61.11

Nestvogel, Dieter K., to Duff-Norton Company, Inc. Self-locking transmission mechanism. 3,587,796, Cl. 192-8.

Nesur-Matic Electronics Corporation: *See—*
Newell, Harold R., 3,588,661.

Netlon (p.T.a.) Limited: *See—*
Mercer, Frank B., 3,587,357.

Neumann, Gerhard W.: *See—*
Nystuen, Arne M.; and Neumann, Gerhard W.,3,587,939.

Neumann, Leopold: *See—*
Schreuer, Walter; Neumann, Leopold; and Rigby, Sherman,3,588,730.

Neuscheler, Friedrich: *See—*
Heidenreich, Karl-Heinz; and Neuscheler, Friedrich,3,588,614.

Neuvirth, Clarence L.: *See—*
Caywood, Shirley A.; and Neuvirth, Clarence L.,3,588,260.

New-Nel Kitchens Products Company: *See—*
Nelson, Arthur O., 3,587,692.

Newberg, Allen E. Torque wrench adapter. 3,587,307, Cl. 73-139.

Newcomer, John I.; and Lambertz, Martin R., to Amerock Corporation. Hand rail bracket assembly. 3,588,020, Cl. 248-225.

Newell, Harold R., to Nesur-Matic Electronics Corporation. Electronic damping for stepping motors. 3,588,661, Cl. 318-696.

Newell, Richard V.: *See—*
Curwen, Peter W.; and Newell, Richard V.,3,588,291.

Newman, Albert P., to KDI Sealtron Corporation, mesne. Multiple conductor cable connector. 3,588,783, Cl. 339-59.

Newton, John S., to Portec, Inc. Rail to tie fastener. 3,587,965, Cl. 238-349.

Nicastro, Lawrence Joseph, to RCA Corporation. Electro-optic devices for portraying closed images. 3,588,225, Cl. 350-160.

Nicholl, Thomas H. Lamp device. 3,588,490, Cl. 240-6.4

Nichols, James William. Card game apparatus. 3,588,115, Cl. 273-135.

Nicholson, Terence P., 1/2 to Corrugated Packing & Sheet Metal Company Limited, The. Sealing means. 3,588,131, Cl. 277-206.

Nickel, Donald L., to Westinghouse Electric Corporation. Protective and cooling cover or housing for semi- buried electrical apparatus. 3,587,908, Cl. 220-4.

Nielsen, Asger T.; and Brewer, Donald R., to Eastman Kodak Company. Arrangement for forming code marks. 3,587,418, Cl. 95-1.1

Nihon Denshi Kabushiki Kaisha: *See—*
Yanaka, Takashi, 3,588,586.

Nippon Denso Company Limited: *See—*
Nakano, Yoshiaki; Okamoto, Atutosi; Taniguchi, Koichi; and Toyama, Koichi, 3,588,190.
Ohta, Kazuhiro; and Shimomura, Kikuo, 3,587,912.

Nippon Electric Company, Limited: *See—*
Inaba, Masao; Nakumura, Harunobu; and Mizukami, Mineo, 3,588,748.
Matsushima, Takao, 3,588,715.
Sawada, Kunio; Matsuda, Yuzo; and Kuwabara, Hiroshi, 3,588,755.
Shiki, Haruo; and Taniya, Takaaki, 3,588,700.
Yoshikawa, Shogo; and Tatsumi, Ryuji, 3,588,739.

Nippon Hoso Kyokai: *See—*
Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi, 3,588,243.

Nippon Kogaku K. K.: *See—*
Yamamoto, Tadaaki; and Takenaka, Hiroshi, 3,588,227.

Nippon Kogaku K.K.: *See—*
Ono, Shigeo; and Hamaguchi, Ichiro, 3,587,421.

Nippon Kokan Kabushiki Kaisha: *See—*
Fuji, Takashi; and Sato, Matsuo, 3,587,300.
Shimotsuma, Teruo; Mori, Toshihiro; Sano, Kazuo; and Miyashita, Tsuneo, 3,588,067.

Nishimoto, Tetsunori; Nakazawa, Kisaburo; Ishihara, Koichiro; and Horikoshi, Hisashi, to Hitachi, Ltd. Error detecting system of adder. 3,588,484, Cl. 235-153.

Nishimura, Sadanori: *See—*
Oguma, Tomio; Nishimura, Sadanori; and Satomi, Tadaatsu,3,587,354.

Niskovskikh, Vitaly Maximovich: *See—*
Khimich, Georgy Lukich; Niskovskikh, Vitaly Maximovich; and Karlinsky, Stanislav Evgenievich,3,587,708.

Nisley, Larry V.; Mueller, Klaus P.; and Kreuter, Kenneth G., to Robertshaw Controls Company. Pneumatic control system and parts therefor or the like. 3,587,395, Cl. 91-47.

Nissan Motor Company, Limited: *See—*
Iijima, Tetsuya, 3,587,353.
Ougi, Nobutake, 3,587,352.
Takahashi, Koichi; and Hitomi, Nobuteru, 3,587,346.

Nissen, Warren I., to Gillette Company, The. Safety razors. 3,587,174, Cl. 30-346.5

Nitro Nobel AB: *See—*
Ljungberg, Sten Herman; and Sternhoff, Bror Lennart Teodor, 3,588,054.

Nitta, Yoshio, to Minolta Camera Kabushiki Kaisha. Film advance and shutter charging device for use in 16mm cameras. 3,587,427, Cl. 95-31.

Nobata, Akio: *See—*
Okuda, Bunichi; Nobata, Akio; Ogawa, Noboru; Okabe, Isamu; Tsuruya, Yoshimasa; and Oosuga, Michitaka,3,587,907.

Noda, Koji, to Minolta Camera Kabushiki Kaisha. Automatic exposure control device for copying machine. 3,588,247, Cl. 355-69.

Nomura, Takuya; and Tada, Yasuo. Method of block recording data on a magnetic tape. 3,588,840, Cl. 340-172.5

Nonaka, Kenshichi. Water-heating apparatus utilizing solar rays. 3,587,559, Cl. 126-271.

Norback, Per Gunnar, to Munters, Carl Georg. Transferrer of the thermodynamic characteristics of two gases. 3,587,723, Cl. 165-5.

Nordberg Manufacturing Company: *See—*
Motz, Jerome C., 3,587,987.

Nordquist, Robert G., to Grimes Manufacturing Co. Projecting lamps having reflector which form rectangular patterns of light. 3,588,493, Cl. 240-41.37

Norgaard, Loring C.: *See—*
Wells, Paul S.; Henderson, Stephen P.; and Norgaard, Loring C.,3,587,505.

Norlindh, Sven Erik Malte, to AB Inva. Metallurgical manipulator. 3,588,274, Cl. 416-63.

Norris Industries, Inc.: *See—*
O'Brien, James, 3,588,017.

North American Rockwell Corporation: *See—*
Ammerman, Robert L., 3,588,076.
Arentz, John C., 3,587,209.
Cumming, James C., 3,588,189.
Escallier, Edward Andrew; and Scully, Charles Norman, 3,587,291.
Fono, Peter, 3,588,559.
Hagopian, Berge, 3,587,397.
Murray, Glenn W., 3,588,681.
Thumim, Carl, 3,587,375.
Williams, James L., 3,588,781.

Northern Electric Company Limited: *See—*
Bohm, John, 3,588,540.
Reedyk, Cornelis W., 3,588,382.

Northup, John D., to Owens-Illinois, Inc. Tamper-proof closure with plastic liner. 3,587,898, Cl. 215-40.

Northwestern University: *See—*
Jacobs, John E., 3,587,298.

Nottnagel, Wolf; and Schrenk, Oskar, to Siemens Aktiengesellschaft. Switching circuit to control call number transmitters in automatic telephone systems. 3,588,370, Cl. 179-27.

Nova Machinery Pty. Ltd.: *See—*
Krause, Eric George, 3,587,452.

Nowicki, Raymond M. Carburetor air intake filters. 3,587,212, Cl. 55-274.

NSU Motorenwerke Aktiengesellschaft: *See—*
Lechler, Rolf, 3,587,649.

Numata, Tsuneo, to Matsushita Electronics Corporation. Magnetrol device with exiting permanent magnet free from magnets short-circuiting by frame. 3,588,588, Cl. 315-39.51

Nuova San Giorgio S.p.A.: *See—*
Marenco, Mario, 3,587,804.

Nuovo Pignone S.p.A.: *See—*
Vinciguerra, Costantino, 3,588,292.

Nutron Corporation: *See—*
Denker, James M., 3,587,650.

N.V. Machinefabriek L. Te Strake: *See—*
Van Mullekom, Hubert Peter, 3,587,664.

Nystrom, Kjell Signar, to Svenska Industrietableringsaktiebolaget, mesne. Rotary cutter with insertable cutting elements and cutting element for use therein. 3,587,151, Cl. 29-105.

Nystuen, Arne M.; and Neumann, Gerhard W., to Whirlpool Corporation. Motor-pump. 3,587,939, Cl. 222-333.

O'Boyle, Thomas W. Boat boarding device. 3,587,123, Cl. 9-400.

O'Brien, James, to Norris Industries, Inc. Nail bracket for electrical boxes. 3,588,017, Cl. 248-205.

Ochs, John. Device for securing and adjusting springs. 3,588,074, Cl. 267-73.

Oelke, Waldemar W., to Libbey-Owens-Ford Company. Apparatus for cutting glass plates. 3,587,956, Cl. 225-93.5

Oeswein, Evalin T. Method for production of ornamental design in plastic object. 3,587,179, Cl. 35-26.

offene Handelsgesellschaft: *See—*
Reichrath, Ernst Georg; and Buchheit, Otto Karl, 3,588,044.

Ogawa, Noboru: *See—*
Okuda, Bunichi; Nobata, Akio; Ogawa, Noboru; Okabe, Isamu; Tsuruya, Yoshimasa; and Oosuga, Michitaka,3,587,907.

Ogden, Bruce R., to Ogden, Claude R., & Co. Pty. Limited. Desk. 3,588,211, Cl. 312-194.

Ogden, Claude R., & Co. Pty. Limited: *See—*
Ogden, Bruce R., 3,588,211.

Oglesbee, Edgar Crain: *See—*
Beach, John Myers; Oglesbee, Edgar Crain; White, Arthur Roger; Ziegler, George Stephen; and Cecil, Harry Hamilton,3,587,788.

Oguma, Tomio; Nishimura, Sadanori; and Satomi, Tadaatsu, to Honda Giken Kogyo Kabushiki Kaisha. Change-speed characteristic control apparatus in automatic transmission apparatus for vehicle. 3,587,354, Cl. 74-868.

Ohlin, Lars Erik; Lofvenmark, Jan Olof; and Carlsson, Gosta, to Linson Instrument Aktiebolag. Apparatus for sequential treatment and analysis of samples. 3,587,676, Cl. 141-130.

Ohlsen, Bengt Ludvig: *See—*
Lindahl, Carl-Axel; Ohlsen, Bengt Ludvig; and Hjort, Lars Ake Valdemar,3,588,272.

Ohta, Kazuhiro; and Shimomura, Kikuo, to Nippon Denso Company Limited. Pressure cap unit with pressure releasing means for radiators of internal combustion engines. 3,587,912, Cl. 220-40.

Oil Center Research, Inc.: *See—*
Hinds, Cyril, 3,588,029.

Oiso, Mitsuo, to Fujitsu Limited. Discriminator circuit for separating binary data signals and clock signals from a modulated binary data signal. 3,588,718, Cl. 329-104.

Okabe, Isamu: *See—*
Okuda, Bunichi; Nobata, Akio; Ogawa, Noboru; Okabe, Isamu; Tsuruya, Yoshimasa; and Oosuga, Michitaka,3,587,907.

Okamoto, Atutosi: *See—*
Nakano, Yoshiaki; Okamoto, Atutosi; Taniguchi, Koichi; and Toyama, Koichi,3,588,190.

Okamoto, Harumichi; Shikata, Toshio; and Magaribuchi, Kazuo, to Tokyo Shibaura Electric Co., Ltd. Coated metal mold. 3,588,028, Cl. 249-116.

Okamura, Mitsumaro: *See—*
Tokumitsu, Ichiro; Okamura, Mitsumaro; and Asano, Souji,3,587,727.

O'Keeffe, Terence W., to Westinghouse Electric Corporation. Masked photocathode structure with a masked, patterned layer of titanium oxide. 3,588,570, Cl. 313-94.

Okleshen, Ernest John, to Magnavox Company, The. Mounting means for light source in facsimile equipment. 3,588,337, Cl. 178-7.1

Okubo, Kei: *See—*
Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi,3,588,243.

Okuda, Bunichi; Nobata, Akio; Ogawa, Noboru; Okabe, Isamu; Tsuruya, Yoshimasa; and Oosuga, Michitaka, to Mitsubishi Denki Kabushiki Kaisha. Bread toaster. 3,587,907, Cl. 220-4.

Oldberg Manufacturing Company: *See—*
Zmuda, Daniel A., 3,587,272.

Olin Mathieson Chemical Corporation: *See—*
Burne, Frederick A., 3,587,732.
Creith, Lou C., 3,587,911.
Russell, Lowell L.; and Bender, Donald E., 3,587,782.

Olinkraft, Inc.: *See—*
Graser, Earl J., 3,587,847.

Olivetti, C., Ing., & C., S.p.A.: *See—*
Becchi, Raffaele, 3,588,453.

Olivetti General Electric S.p.A.: *See—*
Bertolini, Gianni; and Vinsani, Mario, 3,588,666.

Olivetti, Ing. C., & C., S.p.A.: *See—*
Zaffignani, Giovanni; and Mioc, Gualtiero, 3,588,646.

Ollis, George E., to United States Steel Corporation. Network cable. 3,588,318, Cl. 174-121.

Olmo, Harold P.: *See—*
Studer, Henry E.; and Olmo, Harold P.,3,587,931.

O'Loughlin, Francis A., to Thomas & Betts Corporation, The. Two-piece insulation piercing connector. 3,588,788, Cl. 339-98.

Olsasky, Mark J.: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,587,424.

Olsen, Karl M.; and Stoffers, Raymond C., to Bell Telephone Laboratories, Incorporated. Magnetic alloy and devices utilizing same. 3,588,764, Cl. 335-154.

Olsen, Zenny, to Allied Control Company, Incorporated. Fluid control apparatus. 3,587,617, Cl. 137-85.

Olson, Albert Kenneth; and Lundell, Raymond C., to Minnesota Mining and Manufacturing Company. Electrically heated die-cutting apparatus. 3,587,377, Cl. 83-171.

Olson, Walter L.: *See—*
White, Stanley E.; Platt, Eric G.; and Olson, Walter L.,3,588,367.

Omark Industries, Inc.: *See—*
Gonzalez, Ricardo, 3,587,285.

Omohundro, William A., to General Electric Company. Hair treating apparatus. 3,588,444, Cl. 219-362.

Omron Tateisi Electronics Co.: *See—*
Akamatsu, Hiroo; and Morita, Takanobu, 3,588,513.

Ono, Shigeo; and Hamaguchi, Ichiro, to Nippon Kogaku K.K. Electric exposure meter. 3,587,421, Cl. 95-10.

Oosuga, Michitaka: *See—*
Okuda, Bunichi; Nobata, Akio; Ogawa, Noboru; Okabe, Isamu; Tsuruya, Yoshimasa; and Oosuga, Michitaka,3,587,907.

Oppenheim, Henry; and Walker, Jonas, to Intercontinental Machinery Corporation. Automatic material cutting machine. 3,587,378, Cl. 83-201.07

Oppenheimer, Edgar D.; and Roberts, Sidney, to AMF Incorporated. Apparatus for use in high-frequency welding. 3,588,427, Cl. 219-59.

OPTO/Graphics, Inc.: *See—*
Bost, Jonathan, 3,588,094.

Orend, Friedrich, to Voith Getriebe KG. Cutter head. 3,587,385, Cl. 90-11.

Organon, Inc.: *See—*
De Jong, Elkan J., 3,588,055.

O'Riley, Kenneth Walter, to Vickers Limited. Tools with respect to workpieces in environmental chambers. 3,588,442, Cl. 219-121.

Oriti, Biagio. Automatic cigarette box. 3,587,922, Cl. 221-203.

Ormiston, Peter Thomas, to Solartron Electronic Group Limited, The. Weapon-training systems. 3,588,108, Cl. 273-101.1

Ort, Wolfgang, to Eastman Kodak Company. Shutter for photographic camera. 3,587,434, Cl. 95-59.

Ortheil, Johannes, to Langen & Company. Hydraulic auxiliary power steering means for vehicles. 3,587,768, Cl. 180-79.2

Orthopedic Equipment Company: *See—*
Keller, Donald D., 3,587,584.

Ortolano, Ralph J.; Welch, William P.; and Semar, Harold W., to Westinghouse Electric Corporation. Blade structure for an axial flow elastic fluid utilizing machine. 3,588,278, Cl. 416-190.

Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi, to Nippon Hoso Kyokai, and Matsushita Electric Industrial Co., Ltd. Card handling apparatus. 3,588,243, Cl. 355-40.

Osban, William R.: *See—*
Fisher, Don E.; and Osban, William R.,3,587,989.

Osborne, Thomas E.; Magleby, Kay B.; and Lukes, Joseph A., to Hewlett-Packard Company. Information display apparatus. 3,588,873, Cl. 340-324.

Oscarsson, Gunnar. Protective plate or shield for use in connection with dental treatment. 3,587,566, Cl. 128-12.

Osterreichische Mineralolverwaltung Aktiengesellschaft: *See—*
Varga, Georg, 3,588,165.

Otero, Ruben Q.: *See—*
Cozeck, Anthony J.; Otero, Ruben Q.; and Pierce, Walter E.,3,588,019.

Otis Elevator Company: *See—*
Krauer, Otto Albert; and Kornbluth, Sheldon Edwin, 3,587,785.

Otte, Richard F., to Raychem Corporation. Unsoldering method and apparatus using heat-recoverable materials. 3,588,618, Cl. 317-101.

Otto, Friedrich: *See—*
Rogalski, Manfred; and Otto, Friedrich,3,587,693.
Rogalski, Manfred; and Otto, Friedrich,3,587,694.

Ougi, Nobutake, to Nissan Motor Company, Limited. Hydraulic control system for an automatic transmission mechanism. 3,587,352, Cl. 74-868.

Outboard Marine Corporation: *See—*
Shimanckas, William J., 3,587,510.

Outokumpu Oy: *See—*
Fallenius, Kai B.; and Varmola, Keijo A., 3,588,685.

Overly, Inc.: *See—*
Overly, William F.; and Pagel, Kenneth J., 3,587,177.

Overly, William F.; and Pagel, Kenneth J., to Overly, Inc. Airfoil nozzle. 3,587,177, Cl. 34-156.

Overton Company: *See—*
Rustin, Rudolph B., Jr., 3,587,903.

Ovshinsky, Stanford R.: *See—*
Fleming, Gordon R.; and Ovshinsky, Stanford R.,3,588,638.
Fleming, Gordon R.; and Ovshinsky, Stanford R.,3,588,639.

Owen, Arthur L., to Electric Wireline Specialties, Inc. Bottom hole shut-in tool. 3,587,735, Cl. 166-129.

Owen, Kenneth: *See—*
Kershner, Stephen W.; and Owen, Kenneth,3,588,390.

Owens-Illinois, Inc.: *See—*
Brown, Gerald N., 3,587,836.

Heier, Robert J., 3,587,846.
Murley, Ellsworth M., Jr., 3,588,597.
Northup, John D., 3,587,898.
Sendt, Alfred R., 3,588,258.
Sorbie, Thomas B., 3,587,815.

Oxenham, John, to Vero Precision Engineering Limited. Tool length measuring devices for use with machine tools. 3,587,360, Cl. 77-5.

Oxlade, Roy R.: *See—*
Townsend, Nicholas A.; and Oxlade, Roy R.,3,587,267.

Ozaki, Nobuo. Safety spring for the speed change gear of a bicycle. 3,588,077, Cl. 267-176.

Pace, Robert E.: *See—*
Sayre, Jack L.; and Pace, Robert E.,3,588,161.

Pacific Containers Ltd.: *See—*
Millar, Alexander E. J.; Shaver, William W.; and Mrotzek, Richard, 3,587,900.

Packard, Norman M., to International Harvester Company. Ring manufacture, productive of line contact seal. 3,587,155, Cl. 29-156.6

Padial, Guillermo Solomon. Cycle construction. 3,588,144, Cl. 280-236.

Paffrath, Edgar C.: *See—*
Creed, John W., Jr.; and Paffrath, Edgar C.,3,587,612.

Pagel, Kenneth J.: *See—*
Overly, William F.; and Pagel, Kenneth J.,3,587,177.

Painaud, Jean: *See—*
Tritton, Victor R.; and Painaud, Jean,3,588,157.

Paine, T. O., Acting Administrator of the National Aeronautics and Space Administration with respect to an invention of,; and Wells, Willard H. Rotatable arcuate reflector system for telescopes. 3,588,220, Cl. 350-55.

Painton & Company Limited: *See—*
Cartwright, John Anthony, 3,588,392.

Palazzini, Norman S., to Sprague Electric Company. Compensation substrate for dual in line package. 3,588,616, Cl. 317-101.

Pan American Petroleum Corporation: *See—*
Howard, George C., 3,587,743.

Papalia, Rocco: *See—*
Chiffoleau, Robert R.; and Papalia, Rocco,3,588,082.

Papineau, Milton D., to United States of America, Navy. Locating transducer array on keel. 3,588,798, Cl. 340-6.

Park-O-Matic Mfg., Inc.: *See—*
Ellefson, Clarence L., 3,588,397.

Parker, Bernard: *See—*
Riordan, Hugh E.; Parker, Bernard; and Weisbord, Leon,3,587,326.

Parker, Harry W., to Phillips Petroleum Company. In situ combustion production method. 3,587,738, Cl. 166-259.

Parker, Harry W., to Phillips Petroleum Company. Method of removing permeability blocks. 3,587,739, Cl. 166-261.

Parker, Wallace James; and Parker, William Mitchell. Apparatus for raising, stacking and lowering barrels. 3,587,894, Cl. 214-622.

Parker, William Mitchell: *See—*
Parker, Wallace James; and Parker, William Mitchell,3,587,894.

Parker-Hannifin Corporation: *See—*
Kenyon, Richard L., 3,587,618.

Parkinson, James R.; and Gamache, Robert W., to Simmonds Precision Products, Inc. Two-gear, misalignment compensated torque system. 3,587,305, Cl. 73-136.6

Parquet, Donald James; and Hall, Daniel Luce, to Deere & Company. Pressure-compensated flow control valve. 3,587,630, Cl. 137-504.

Parquet, Donald James; Hall, Daniel Luce; and Gregerson, Stanley Martin, to Deere & Company. Control valve means for a two-way hydraulic cylinder. 3,587,399, Cl. 91-420.

Parr, Bryan R.: *See—*
Martindale, Allan; Allanson, John T.; and Parr, Bryan R.,3,587,240.

Patent-Treuland-Gesellschaft fur Elektrische Gluhlampen mbH: *See—*
Berlinghof, Theo, 3,588,602.

Paterson, Thomas Glynn, to RCA Corporation. Electronic check cashing system. 3,588,449, Cl. 235-61.7

Paton, Hamilton Neil King, to Dynabulk Corporation. Material container with end discharge port. 3,587,935, Cl. 222-195.

Patterson, Walter H. Boat with secondary propulsion means. 3,587,512, Cl. 115-41.

Paulauskas, Justin V.: *See—*
Barbas, Joseph, Jr.; Paulauskas, Justin V.; and Peterson, William C.,3,588,515.

Paull, Peter L.: *See—*
Armistead, Fontaine C.; and Paull, Peter L.,3,588,796.

Pauly, Paul E. Mechanical arm and control means therefor. 3,587,872, Cl. 214-1.

Pavone, Robert Joseph: *See—*
Logan, David Jopson; Webster, Ronald B.; Pavone, Robert Joseph; and Richardson, David Gilmer, Jr.,3,588,081.

Peak, Charles Benjamin, to Deere & Company. Belt drive mechanism. 3,587,336, Cl. 74-242.11

Peak, Charles Benjamin, to Deere & Company. Combine straw chopper mounting. 3,587,690, Cl. 146-117.

Pearce, James L. Outdrive protective apparatus. 3,587,508, Cl. 115-0.5

Pearson, Ernest A.: *See—*
Avery, Carl F., Jr.; Pearson, Ernest A.; and Winters, Lloyd V.,3,587,920.

Pebenito, Amable A.: *See—*
Young, Virgil F.; and Pebenito, Amable A.,3,588,379.

Peck, David B., to Sprague Electric Company. Encapsulated electrical component with planar terminals. 3,588,628, Cl. 317-230.

Peczkowski, Joseph L., to Bendix Corporation, The. Combustion engine fuel control having govenor reset means. 3,587,229, Cl. 60-39.16

Peddinghaus, Carl Ullrich. Load bearing assembly. 3,588,075, Cl. 267-121.

Pedersen, John H.; Malmer, Michael M., Jr.; Hebeler, Charles B.; and Chang, Hoy Ying, to Burroughs Corporation. Terminal station. 3,588,834, Cl. 340-172.5

Pegrum, James W., to Atomic Energy of Canada Limited. Radiation therapy machine with a rotatable hypesbaric chamber having a radiation source mounted therein. 3,588,499, Cl. 250-55.

Pehr, Harold T. Dispensers with integral remorable closures. 3,587,944, Cl. 222-480.

Pekelharing, Adrianus J.; and de Bruyn, Hendrik E., to Cincinnati Milacron Inc. Method and apparatus for electrical discharge machining using a substantially constant current density during a spark discharge. 3,588,431, Cl. 219-69.

Pekosh, Raymond J.: *See—*
Mac Lean, Gerald K.; and Pekosh, Raymond J.,3,588,567.

Penar, James D.: *See—*
Cohen, Marvin M.; Penar, James D.; and Kurtz, David W.,3,588,634.

Pepe, William V., to ARC-Co Incorporated. Electric utility box. 3,587,906, Cl. 220-3.2

Peres, Axel Gote; and Ericson, Lars Bert Ronald. Holder clip for pipes, cables. 3,588,011, Cl. 248-68.

Perez-Stable, Nicolas L., to Westinghouse Electric Corporation. Frequency shift relaying protective network with noise control. 3,588,610, Cl. 317-28.

Periman, Rubie E.: *See—*
Ferguson, Clarence R.; and Periman, Rubie E.,3,587,356.

Perlman, Stuart S.; and Mc Cusker, Joseph H., to RCA Corporation. Adaptive resonant filter. 3,588,551, Cl. 310-8.1

Peroy, Francois: *See—*
Rouvre, Philippe A. R.; Pineau, Jean E. X.; Peroy, Francois; and Delay-action motor energizing control devices,3,588,657.

Perriman, Harold R., to Sundstrand Corporation. Bearing lubrication device. 3,587,780, Cl. 184-6.

Perry, Charles W.; and Wendroff, Benjamin, to Kidde, Walter, & Company, Inc. Roof mounted foam generator with automatically opening ventilator. 3,587,745, Cl. 169-15.

Perry, Frederic F., to Quinn, K. J., & Co., Inc. Curtain coating apparatus. 3,587,527, Cl. 118-324.

Perry, Roger L., to Gillette Company, The. Razor. 3,587,171, Cl. 30-40.1

Petersen, Jorgen Hartvig, to Danfoss A/S. Rotary seal, for oil pumps. 3,588,128, Cl. 277-93.

Peterson, Bertil E., to Cardwell Westinghouse Company. Draft gear. 3,587,871, Cl. 213-38.

Peterson, Noel C.: *See—*
Buck, Daniel C.; and Peterson, Noel C.,3,588,759.

Peterson, Thomas F., to Preformed Line Products Co. Appliance for linear bodies. 3,588,316, Cl. 174-84.

Peterson, William C.: *See—*
Barbas, Joseph, Jr.; Paulauskas, Justin V.; and Peterson, William C.,3,588,515.

Petree, Frank. Level detector. 3,588,859, Cl. 340-244.

Petrie, Adelore F.: *See—*
Kingsbury, L. C. James; and Petrie, Adelore F.,3,588,122.

Petrov, Jury Vyacheslavovich: *See—*
Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich,3,587,673.

Peyre, Xavier Marie Joseph Antoine. Two armed ratchet wrench. 3,587,364, Cl. 81-57.39

Pfaff, G. M., AG: *See—*
Murdter, Gerhard, 3,587,499.

Pfeiffer, Erich A. Pneumatic computer. 3,588,454, Cl. 235-61.11

Philips, Gerald J.: *See—*
Daugherty, Thomas L.; and Philips, Gerald J.,3,588,205.

Phillips, Harold E., to St. Paul Brass Foundry Company. Boot and overshoe caddy. 3,587,865, Cl. 211-37.

Phillips Petroleum Company: *See—*
Hays, George E., 3,587,731.
Leonard, Silvester C., 3,587,726.
Parker, Harry W., 3,587,738.
Parker, Harry W., 3,587,739.

Phonix Armaturenwerke Bregel GmbH: *See—*
Krause, Walter, 3,587,634.

Phonocopy, Inc.: *See—*
Hackett, Kenneth R., 3,588,912.

Picillo, Vincent M., to United States of America, Army, mesne. Electronic switch. 3,588,538, Cl. 307-246.

Picker Corporation: *See—*
Gager, Robert M., 3,588,510.

Pieloth, Manfred: *See—*
Kong, Gerhard; and Pieloth, Manfred,3,587,607.

Pierce, Harold C., to Eastman Kodak Company. Cartridge opener. 3,587,954, Cl. 225-93.

Pierce, Walter E.: *See—*
Cozeck, Anthony J.; Otero, Ruben Q.; and Pierce, Walter E.,3,588,019.

Pierrat, Michael A., to Automatic Radio Mfg., Co., Inc. Constant speed drive. 3,587,237, Cl. 60-53.

Pigache, Claude: *See—*
Szekely, Laszlo; Pigache, Claude; and Lafaye, Michel,3,587,797.

Pigni, Umberto; and Forni, Luigi, to Pomini Farrel S.p.A. Continuous rolling mill. 3,587,277, Cl. 72-234.

Pineau, Jean E. X.: *See—*
Rouvre, Philippe A. R.; Pineau, Jean E. X.; Peroy, Francois; and Delay-action motor energizing control devices,3,588,657.

Pink, Edward N. Apparatus for adjusting pressure plate spring tension. 3,587,802, Cl. 192-89.

Pinnow, Roy Lee: *See—*
Giesfeldt, William Ott; and Pinnow, Roy Lee,3,588,636.

Pipa, William J. Warning mechanism for gentle handling of doll. 3,588,118, Cl. 274-1.

Pirelli General Cable Works Limited: *See—*
Baskwell, John A., 3,587,522.

Piret, Jean, to Regie Nationale des Usines Renault, and. Time-lag pressure responsive switches Automobiles Peugeot. 3,588,403, Cl. 200-83.

Pitner, Alfred, 1/2 to Nadella S.A. Sealing device. 3,588,129, Cl. 277-95.

Pitts, Robert D.; and Mc Allister, Lewis L., to Collins Radio Company. Work support mechanism. 3,587,391, Cl. 90-11.

Planny Kabushiki Kaisha (Planny, Ltd.): *See—*
Miyata, Yoshimasa, 3,587,838.

Plastiers Limited of Nathan Way: *See—*
Edmondson, Ronald, 3,588,132.

Platt, Eric G.: *See—*
White, Stanley E.; Platt, Eric G.; and Olson, Walter L.,3,588,367.

Platzer, George E., Jr., to Chrysler Corporation. Day-night rear mirror remote actuator. 3,588,231, Cl. 350-279.

Plechac, Bohuslav; and Mudrik, Josef, to Statni vyzkumny ustav kozedelny. Through-feed ironing machine. 3,587,258, Cl. 69-43.

Plomb, Francis: *See—*
Fresard, Marcel; and Plomb, Francis,3,587,500.

Plumb, Edwin William. Safety device. 3,587,344, Cl. 74-612.

Plummer & Kershaw: *See—*
Plummer, John L., 3,587,289.

Plummer, John L., to Plummer & Kershaw. Optical micrometer. 3,587,289, Cl. 73-102.

Plutts, Koecke & Co.: *See—*
Rosenkranz, Dieter; and Bous, Karl, 3,587,974.

Pneumo Dynamics Corporation: *See—*
Meulendyk, John W.; and Vanderlaan, Robert D., 3,587,963.

Poehlman, Edmund F., Jr., to Fuse Indicator Corporation. Fuse holder for electrical circuits. 3,588,775, Cl. 337-226.

Poirier, Joseph L.: *See—*
Goggins, William B., Jr.; and Poirier, Joseph L.,3,588,895.

Polaroid Corporation: *See—*
Biber, Conrad H., 3,587,425.
Bloom, Stanley Morton, 3,588,216.
Erlichman, Irving, 3,587,426.

Polglase, Burton C., to Wood Industries, Inc., mesne. Web threading device in rotary printing machines. 3,587,461, Cl. 101-219.

Polidori, Mario, to AMP Incorporated. Electrical connector 3,588,791, Cl. 339-747.

Pollock, Samuel C., to General Motors Corporation. Rectanular vehicle headlamp with collimating discs. 3,588,492, Cl. 240-41.1

Polycontact AG: *See—*
Ramstetter, Rudolf, 3,588,455.

Polysius G.m.b.H.: *See—*
Henne, Heinrich; and Tiggesbaumker, Peter, 3,587,980.

Pomini Farrel S.p.A.: *See—*
Pigni, Umberto; and Forni, Luigi, 3,587,277.

Poole, Edward M. Barrel type engine. 3,587,538, Cl. 123-45.

Popa, Valeriu Serfiu: *See—*
Enoiu, Constantin; and Popa, Valeriu Serfiu,3,587,348.

Pope, Walter F.: *See—*
Leathem, Douglas B.; Jones, Raymond A.; and Pope, Walter F.,3,588,612.

Popeil Brothers, Inc.: *See—*
Popeil, Samuel J., 3,587,595.

Popeil, Samuel J., to Popeil Brothers, Inc. Clip. 3,587,595, Cl. 132-46.

Porath, Gordon H.; and Martin, Anthony J., to Babcock & Wilcox Company, The. Multiple spindle bar automatic machine. 3,587,370, Cl. 82-3.

Portec, Inc.: *See—*
Newton, John S., 3,587,965.

Porter, Allan William Henry, to Aktiengesellschaft Adolph Saurer. Driving and braking mechanism. 3,587,667, Cl. 139-142.

Porter, Lester H., Jr. Self-monitoring field contacts for automatic alarm systems. 3,588,891, Cl. 340-409.

Porter, Raymond J., to Gulf & Western Industrial Products Company, mesne. Quick change tool adaptor. 3,588,135, Cl. 279-83.

Porter, Wellington W. Asparagus harvester. 3,587,215, Cl. 56-327.

Postmaster General, Her Majesty's:*See—*
Knox, Keith Anthony Thomas, 3,588,360.

Potter, Frank, to Stromberg-Carlson Corporation. Space divided link circuit with high impedance current source. 3,588,368, Cl. 179-18.

Potter, Howell L., to Textron Inc. Hollow bearing balls. 3,587,154, Cl. 29-148.4

Potter, Olin E.; and Tomasi, Biagio J., to Worthington Corporation. Under chassis power take-off driven compressor system. 3,588,288, Cl. 417-234.

Potter, Roderick B.; and Slocum, Jack D., to Kelley Company, Inc. Hinge construction for joining the lip to the ramp of a dockboard. 3,587,126, Cl. 14-71.

Povoas, Lawrence Brian, to British Hovercraft Corporation Limited. Apparatus to determine the out of balance moment of an object. 3,587,296, Cl. 73-65.

Powell, Jonathan S. Shut off valve. 3,588,034, Cl. 251-8.

Powell, Milan: *See—*
Mundt, James E.; and Powell, Milan,3,587,157.

Powell, R Gordon: *See—*
Atkinson, Eulas R.; and Powell, R Gordon,3,587,869.

Power-Curve Conveyor Company: *See—*
Dahlem, Billy J.; and Martin, John A., 3,587,876.

Powers, Richard J.: *See—*
Broom, Cecil A., 3,588,241.

Pozdnyakov, Petr Grigorievich; and Androsova, Valentina Georgievna. Piezoelectric quartz vibrator. 3,588,554, Cl. 310-9.5

Prager, Hans John: *See—*
Chang, Kern K. N.; Prager, Hans John; and Weisbrod, Sherman,3,588,735.

Pratt, Ryder: *See—*
Von Brecht, Forrest G.; and Pratt, Ryder,3,587,839.

Preformed Line Products Co.: *See—*
Peterson, Thomas F., 3,588,316.

Premo, Charles N., to Koehring Company, mesne. Mold charging apparatus. 3,587,134, Cl. 18-5.

Presia, Elmo James: *See—*
Miller, David S.; Presia, Elmo James; and Cooper, Alan G.,3,588,630.

Prevett, Peter Dominic; and Morin, Theodore Joseph, to Industrial Magnetics, Inc. Conductive solids welding circuitry. 3,588,437, Cl. 219-113.

Prew, Thomas B., to Stafford Tool and Die Company Limited. Method and apparatus for cutting a workpiece. 3,587,372, Cl. 83-16.

Price, Howard; and Szilagyi, Bela, to International Patents & Development Corporation, mesne. Podiatric stand. 3,587,592, Cl. 128-395.

Prickett, Alfred Donald, to Lucas, Joseph, (Industries) Limited. Contact breaker assemblies. 3,588,414, Cl. 200-166.

Prickett, Alfred Donald, to Lucas, Joseph, (Industries) Limited. Warning device for use with seat belts. 3,588,811, Cl. 340-52.

Prickett, Michael J., to United States of America, Navy. Automatic gain control system for high-range- resolution radar. 3,588,894, Cl. 343-5.

Priestley, Robert J.: *See—*
Angevine, Peter A.; and Priestley, Robert J.,3,588,063.

Printing Developments, Inc.: *See—*
Bartel, Karl; and Ross, Austin, 3,588,322.

Prior, Josef, to Dynamit Nobel Aktiengesellschaft. Relay charge with a fuse of weakened explosive power. 3,587,466, Cl. 102-27.

Pritchard, Dalton Harold, to RCA Corporation. Adjustable bandwidth optical filter. 3,588,224, Cl. 350-157.

Pritchett, Ervin R.: *See—*
Bricmont, Francis H.; and Pritchett, Ervin R.,3,587,268.

Probstein, Ronald F.; and Schwartz, Josef. Method of separating solid particles from a slurry with wash column separators. 3,587,859, Cl. 210-66.

Propster, John A., to Hughes Aircraft Company. Digital-to-analog converter. 3,588,882, Cl. 340-347.

Protas, Arthur I., to Cartridge Television, Inc., mesne. Tape recording and reproducing system of the skip field type, with separate recording head. 3,588,378, Cl. 179-100.2

Prussin, Samuel; and Mason, Jimmie L., to Dart Industries Inc. Dispensing vaporous and product value with lip for components separately and sequentially. 3,587,941, Cl. 222-402.17

Puhringer, Othmar; and Holik, Karl, to Vereinigte Osterreichische Eisen-und Stahlwerke Aktiengesellschaft. Vehicle for transporting and weighing metallurgical vessels. 3,587,760, Cl. 177-141.

Pullman Incorporated: *See—*
Capriola, Ralph L., 3,587,648.
Ferris, Ray L.; Shaver, William R.; and Dohne, Jan W., 3,587,477.
Nagy, Ernest J., 3,588,181.
Yates, Donald B., 3,587,868.

Purkhiser, Rawlins E., to Air Reduction Company, Incorporated. Master-slave plural motor positioning control. 3,588,660, Cl. 318-658.

Purman, Joseph W., to Allis, Louis, Company, The. Self-equalizing, self-aligning thrust bearing. 3,588,203, Cl. 308-160.

Putzmeister GmbH: *See—*
Schlecht, Karl, 3,588,294.

Pyronetics, Inc.: *See—*
Shippy, William J., 3,587,601.

Pysnik, Joseph, to United States Steel Corporation. Circuit for converting time delay to voltage. 3,588,699, Cl. 324-189.

Quase, Harold G., to Underwater Storage, Inc. Waste disposal system. 3,587,116, Cl. 4-10.

Quedens, Phillipp J.: *See—*
Burrows, Milford D.; and Quedens, Phillipp J.,3,587,387.

Quenet, Christian Fernand Michel; and Rochereau, Jacques Louis Jean-Pierre, to Societe de Telecommunications Electronique,

Aeronautique et Maritime 'T.E.A.M.'. Electron relay adapted to be used notably as a universal telegraph relay. 3,588,339, Cl. 178-70.
Quereshi, Umar; and Fortescue, Thomas Richard, to Solartron Electronic Group Limited, The. Analog-to-digital converters. 3,588,884, Cl. 340-347.
Quinaud, Michel C.: *See—*
Dugeny, Pierre L.; Gerain, Jean R.; Quinaud, Michel C.; and Zangheri, Daniel C.,3,587,813.
Quinn, K. J., & Co., Inc.: *See—*
Perry, Frederic F., 3,587,527.
Raad, Laura A.: *See—*
Freund, Artice M.; Raad, Laura A.; and Johnson, Wendell J.,3,588,248.
Rabinowitz, Mario; and Garwin, Edward L., to United States of America, Atomic Energy Commission. Method of operating an ion-getter vacuum pump with gun and grid structure arranged for optimum ionization and sublimation. 3,588,593, Cl. 315-108.
Ragen, Robert A., to Singer Company, The. Programmable electronic calculator. 3,588,841, Cl. 340-172.5
Ragsdale, Charles W., to United States of America, Army. Heartbeat monitor. 3,587,563, Cl. 128-2.06
Raickle, John A., to Industrial Micronics Incorporated. Apparatus for threading matrix cores. 3,587,160, Cl. 29-203.
Raleigh, William F., to Carrier Corporation. Furnace having multiple speed motor and accessory control system. 3,587,558, Cl. 126-113.
Ramig, Robert J., Jr., to Teletype Corporation. Tape guide. 3,588,346, Cl. 178-42.
Ramstetter, Rudolf, to Polycontact AG. Embossed record card. 3,588,455, Cl. 235-61.12
Ranco Incorporated: *See—*
Hersey, Harold E., 3,588,395.
Randell, Brian: *See—*
Belady, Laszlo A.; Kuehner, Carl J.; Lehman, Meir M.; and Randell, Brian,3,588,839.
Randich, Erasmus A., to Allegheny Ludlum Steel Corporation. Method and apparatus for rolling flat material in rolling mills or the like. 3,587,266, Cl. 72-16.
Randich, Erasmus A., to Allegheny Ludlum Steel Corporation. Process and aparatus for continuously processing steel and other materials. 3,587,276, Cl. 72-227.
Randmere, Uno: *See—*
Bartlett, William F.; Randmere, Uno; and Scott, Richard,3,588,833.
Randol, Glenn T. Safety razor with disposable blade magazine. 3,587,170, Cl. 30-40.
Ransbury Electro-Coating Corporation: *See—*
Badger, David H., 3,587,967.
Rapoza, James P.: *See—*
Turner, Elbert L.; Rapoza, James P.; and Jackman, Clude A.,3,588,716.
Rapp, Gunther, to Siemens Aktiengesellschaft. Conductor path arrangement for fixed value storer. 3,588,850, Cl. 340-174.
Rappaport, Maximiliano, to United States Envelope Company. Article counting system. 3,587,414, Cl. 93-93.
Rapport, Jerry. Vent screen assembly. 3,587,443, Cl. 98-114.
Rash, Ross D.; Anderson, Duane H.; Nelson, Hilding E.; and Byrns, Paul D., said Rash, said Anderson, and said Nelson assors. to Comcet Incorporated. Systems activity monitor. 3,588,837, Cl. 340-172.5
Raskhodoff, Nicholas M. Phase adjusting coupling. 3,587,250, Cl. 64-24.
Raskin, Henry. Bobbin holder for sutering device. 3,587,587, Cl. 128-340.
Rasmussen, Clarence E., to Electronic Control Corporation. Electromechanical pneumatic power controller for environmental conditioning systems. 3,588,674, Cl. 323-19.
Rasmussen, Rolland R.: *See—*
Figueroa, John W.; Morgan, William J.; and Rasmussen, Rolland R.,3,588,831.
Ratcliff Industries, Inc.: *See—*
Ratcliff, John W.; and Ratcliff, Rudy J., 3,588,167.
Ratcliff, John W.; and Ratcliff, Rudy J., to Ratcliff Industries, Inc. Frame construction for a telescopic trailer. 3,588,167, Cl. 296-27.
Ratcliff, Rudy J.: *See—*
Ratcliff, John W.; and Ratcliff, Rudy J.,3,588,167.
Rawson, Eric G.: *See—*
Herriott, Donald R.; and Rawson, Eric G.,3,588,245.
Ray, Constant Roosevelt: *See—*
Rollow, Jesse Douglas, Jr.; and Ray, Constant Roosevelt,3,587,978.
Raychem Corporation: *See—*
Otte, Richard F., 3,588,618.
Wold, Robert A., 3,588,150.
Raymond, Robert E., to International Basic Economy Corporation. Control adjuster for hydraulic apparatus. 3,587,635, Cl. 137-556.
Raynor, Terence Robert: *See—*
Kindell, Colin David; and Raynor, Terence Robert,3,588,787.
Kindell, Colin David; and Raynor, Terence Robert,3,588,792.
Kindell, Colin David; and Raynor, Terence Robert,3,588,793.
RCA Corporation: *See—*
Ball, Henry; and Wagner, Theodor M., 3,588,325.
Barbin, Robert Lloyd, 3,588,566.
Baun, Leonard J., 3,588,351.
Chang, Kern K. N.; Prager, Hans John; and Weisbrod, Sherman, 3,588,735.
Frohbach, Hugh F., 3,588,326.
Heller, Macy E.; and Gerritsen, Hendrik J., 3,588,439.
Henry, Dale V., 3,587,148.
Herscher, Marvin Bernard; and Martin, Thomas Brooks, 3,588,363.
Martin, David F., 3,588,771.
Martin, Thomas B., 3,588,353.
Medwin, Albert H., 3,588,635.
Morris, Clifford Mandeville, 3,588,575.
Nicastro, Lawrence Joseph, 3,588,225.
Paterson, Thomas Glynn, 3,588,449.
Perlman, Stuart S.; and Mc Cusker, Joseph H., 3,588,551.
Pritchard, Dalton Harold, 3,588,224.
Rubenstein, Robert Aron; and Schopp, James Conrad, 3,587,521.
Sohn, Frank M., 3,588,568.
Wright, Carl Macey, 3,588,545.
Rediger, Alvin L.: *See—*
Hoffmeyer, William R.; and Rediger, Alvin L.,3,588,561.
Redpath, Richard J.: *See—*
Leiter, Leigh D.; and Redpath, Richard J.,3,588,096.
Reed, Clifton G. Instrument mount. 3,588,014, Cl. 248-180.
Reed, Richard J.: *See—*
Budenstein, Irwin R.; Reed, Richard J.; and Johnson, Arthur U.,3,587,812.
Reedyk, Cornelis W., to Northern Electric Company, Limited. Directional electret transducer. 3,588,382, Cl. 179-110.
Regie Nationale des Usines Renault: *See—*
Mercier, Jacques, 3,587,439.
Piret, Jean, 3,588,403.
Rouvre, Philippe A. R.; Pineau, Jean E. X.; Peroy, Francois; and Delay-action motor energizing control devices, 3,588,657.
Regnier, Clarence H.; Stewart, Edward J.; and Stewart, Peter E., to Stewart, Edward J., and Stewart, Peter E. Material spreading apparatus. 3,587,933, Cl. 222-178.
Rehm, Siegfried: *See—*
Hoeffer, Herbert; Knirsch, Herbert; and Rehm, Siegfried,3,588,731.
Reichelt, Bernhard: *See—*
Kegel, Kurt; Zollner, Dieter; Reichelt, Bernhard; and Koziol, Konrad,3,588,307.
Reichrath, Ernst Georg; and Buchheit, Otto Karl, to Verwaltungsgesellschaft Moeller und Neumann offene Handelsgesellschaft. Tie rod clamp device. 3,588,044, Cl.
Reikes, Dan; Grimes, James G.; Hale, Carl R.; and Lott, Lewis E., said Grimes to Stern, Howard S., and Meyers, Phillip H. Apparatus for giving upper gastro-intestinal radiological examination. 3,587,576, Cl. 128-222.
Reiner, Ralph E. Shiftable bumper. 3,588,160, Cl. 293-73.
Reiners, Franz; and Kamphausen, Erich, to Monforts, A. Transport device for a web material folding or processing machine. 3,588,088, Cl. 270-79.
Reiners, Franz; and Walk, Georg, to Monforts, A. Turret lathe or like machine. 3,587,368, Cl. 82-2.5
Reiners, Franz; and Walk, Georg, to Monforts, A. Rotary machine tool. 3,587,369, Cl. 82-2.5
Reinfeld, Kurt; and Gouye, Emmanuel V., to Koppers Company, Inc. Apparatus for cutting a continuously cast metal strand. 3,588,066, Cl. 266-23.
Reinhard, Theodor; and Haug, Ernst, to Daimler-Benz Aktiengesellschaft. Mounting arrangement for the base of an ornamental figure. 3,588,016, Cl. 248-204.
Reliance Electric and Engineering Company, The: *See—*
Susor, William C., 3,587,759.
Reller, Louis S.; and Reller, Lucille S. Garment hanger. 3,587,949, Cl. 223-93.
Reller, Lucille S.: *See—*
Reller, Louis S.; and Reller, Lucille S.,3,587,949.
Remond, Pierre, to Ateliers Diederichs. Weft distributor for shuttleless loom. 3,587,662, Cl. 139-122.
Remus, Casimer F., to Bendix Corporation, The. Snubber for a fluid pressure line. 3,587,652, Cl. 138-26.
Remy, E. P., & Cie: *See—*
Berry, Jean-Luc; and Dardaine, Edgar J., 3,587,208.
Renfro, Marvin W. Prefabricated cantilevered building structure. 3,587,197, Cl. 52-73.
Republic Steel Corporation: *See—*
Hammer, Herman J.; Heald, Sherman T.; and Royce, Frank A., 3,588,424.
Rethorst, Scott C. Ridge surface system for maintaining laminar flow. 3,588,005, Cl. 244-41.
Revell Incorporated: *See—*
Agarwala, B. Kumar, 3,588,111.
Reynolds Metals Company: *See—*
Hartz, Gerald, 3,587,823.
Reznik, David, to United States of America, Agriculture. Device for sorting fruit. 3,587,857, Cl. 209-119.
Rhoades, John M., to General Electric Company. Frequency control for tunable laser utilized in a position control system. 3,588,254, Cl. 356-106.
Rhoto, Richard S., to Westinghouse Electric Corporation. Low frequency bandpass filter for use in failsafe applications. 3,588,533, Cl. 302-233.
Rice, Russell W.: *See—*
Berlier, Richard A.; and Rice, Russell W.,3,588,242.

Rich, John, Enterprises, Inc.: *See—*
Rich, John W.; and Walker, Grant W., 3,587,787.

Rich, John W.; and Walker, Grant W., to Rich, John, Enterprises, Inc. Shear action energy absorption material. 3,587,787, Cl. 188-1.

Rich, Maurice E., Jr., to Troxel Manufacturing Company. Cycle saddle and method of forming same. 3,588,171, Cl. 297-195.

Richardson, David Gilmer, Jr.: *See—*
Logan, David Jopson; Webster, Ronald B.; Pavone, Robert Joseph; and Richardson, David Gilmer, Jr., 3,588,081.

Richardson, Harry L.; and Cranston, George E., to Chemical Construction Corporation. Oxygen steel converter. 3,588,070, Cl. 266-34.

Richt, Hubert, to Suddeutsche Mechanische Werkstatten Wolf FRHR Von Hornstein Komimanditgesselschaft. Educational device for programmed instruction. 3,587,180, Cl. 35-35.

Ridgeway, John Dwight. Probe holding assembly for magnetic testing apparatus. 3,588,684, Cl. 324-38.

Ries, Herman E., Jr.; and Gabor, Joseph, to Standard Oil Company. Method and apparatus for removing contaminants from water. 3,587,860, Cl. 210-73.

Rieth, Kurt A., to Textron Inc. Expansible linkage for use in making a watch band or similar article of jewelry. 3,587,226, Cl. 59-79.

Rigby, Sherman: *See—*
Schreuer, Walter; Neumann, Leopold; and Rigby, Sherman, 3,588,730.

Riggs, Robert F.: *See—*
Fleming, Robert F., Jr.; and Riggs, Robert F., 3,588,803.

Rigot, Robert M., to Aerpat A.G. Manually operable tool for installing blind anchor nuts. 3,587,271, Cl. 72-114.

Rigsby, Gerald E.: *See—*
Harris, John R.; and Rigsby, Gerald E., 3,588,591.

Rijinders, Johannes: *See—*
Balder, Jan Jacob; Rijinders, Johannes; and Van Leeuwen, Johannes Aloysius, 3,587,417.

Riner, Robert J., to General Motors Corporation. Viscous fluid clutch. 3,587,801, Cl. 192-58.

Riordan, Hugh E.; Parker, Bernard; and Weisbord, Leon, to General Precision Systems Inc. Acceleration sensing apparatus. 3,587,326, Cl. 73-492.

Riotto, Dominic J., to Commercial Solvents Corporation. Movable wall separators for particulate material storage to prevent bridged material blockages. 3,587,936, Cl. 222-196.

R. I. Patents, Inc.: *See—*
Arnoldy, Roman F., 3,588,432.

Ripka, Josef; Junek, Jan; Marsalek, Milan; and Hortlik, Frantisek, to Uyzkummy Ustav Bavlmarsky. Continuous break spinning method and apparatus. 3,587,219, Cl. 57-34.

Ristuccia, Donald J., to Westinghouse Electric Corporation. Electrical inductive apparatus. 3,588,606, Cl. 317-15.

Ristuccia, Donald J.; and Klein, Kenneth R., to Westinghouse Electric Corporation. Electrical transformer apparatus for ground level installation having fused means accessible from outside the apparatus. 3,588,607, Cl. 317-15.

Ritchie, Henry B., to General Electric Company. Erosion shield for a throttling valve. 3,588,037, Cl. 251-127.

Ritter, Helmut, to Heberlein Patent Corporation. Yarn delivery mechanism. 3,587,961, Cl. 226-90.

Ritter, Josef: *See—*
Gott, Hans; Ritter, Josef; and Ritter, Klaus, 3,588,417.

Ritter, Klaus: *See—*
Gott, Hans; Ritter, Josef; and Ritter, Klaus, 3,588,417.

Ritter, Terry. Carryall assembly. 3,587,698, Cl. 150-35.

Roberts, Don G.: *See—*
Crookshanks, Rex J.; and Roberts, Don G., 3,588,733.

Roberts, Sidney: *See—*
Oppenheimer, Edgar D.; and Roberts, Sidney, 3,588,427.

Roberts, Webster C.: *See—*
Kolb, Edwin R.; Blaha, John F.; and Roberts, Webster C., 3,588,870.

Robertshaw Controls Company: *See—*
Chambers, William W., 3,588,471.
Nisley, Larry V.; Mueller, Klaus P.; and Kreuter, Kenneth G., 3,587,395.

Robertson, Orville Herbert: *See—*
Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin, 3,588,085.

Robinson, Kennard E.; and Schott, Clifford J. Tire pressure signal system. 3,588,813, Cl. 340-58.

Robinson, Marshall M.: *See—*
Luke, Robert R.; Robinson, Marshall M.; and Thomson, Kenneth, 3,588,911.

Robinson, Peter M.; and Jenkins, Peter J., to Dunlop Company Limited, The. Conveyors. 3,587,832, Cl. 198-184.

Robotron Corporation: *See—*
Vanderhelst, Peter W., 3,588,438.

Rochereau, Jacques Louis Jean-Pierre: *See—*
Quenet, Christian Fernand Michel; and Rochereau, Jacques Louis Jean-Pierre, 3,588,339.

Rochla, Kurt, to Windmoller & Holscher. Apparatus for turning advancing flat workpieces in their plane of travel. 3,587,824, Cl. 198-33.

Rockwell Manufacturing Company: *See—*
Fowler, John H.; and Herd, David P., 3,588,130.

Rodely, Alan E.: *See—*
Mc Murtrie, Charles L.; and Rodely, Alan E., 3,587,312.

Rogalski, Manfred; and Otto, Friedrich. Comminuting apparatus for raw and cooked meat. 3,587,693, Cl. 146-192.

Rogalski, Manfred; and Otto, Friedrich. Comminuting apparatus for raw and cooked meat. 3,587,694, Cl. 146-192.

Rogers, George L., to General Electric Company. Heterodyne system for a position servomechanism whereby system is adaptable to a plurality of transducers. 3,588,659, Cl. 318-608.

Rogers, Lawrence W., to Monsanto Company. Ball plunger installing and removal tool. 3,587,363, Cl. 81-53.2

Rogers, Richard E.: *See—*
Brownell, Roy D.; and Rogers, Richard E., 3,587,682.

Rognon, Marcel, to U.S. Philips Corporation. Combined supply and blanking circuit for picture display tubes of colour television receivers. 3,588,585, Cl. 315-13.

Rohde, Le Roy H., to West Company, The. Container closure. 3,587,897, Cl. 215-38.

Rohr Corporation: *See—*
Ellis, Peter H., 3,587,777.
Ellis, Peter H., 3,587,778.

Rohrer, Karl R., Associates: *See—*
Bandy, William J., Jr.; and Sell, Robert L., 3,587,324.

Rohrs, Werner, K.G., Dr.: *See—*
Fuchs, Franz, 3,587,474.

Roller Bearing Company of America: *See—*
Schmidt, Heinrich K., 3,588,201.

Rollow, Jesse Douglas, Jr.; and Ray, Constant Roosevelt. Space fumigation system. 3,587,978, Cl. 239-550.

Rolls-Royce Limited: *See—*
Edwards, Brian Draycott, 3,588,298.
Johnson, Christopher Linley, 3,587,641.
Jubb, Albert, 3,588,276.
Scott-Scott, John Lanfear; and Sweetland, David John, 3,588,266.
Wilkinson, Wilfred Henry; and Cooper, Paul William, 3,588,267.

Romanowski, Albert F.; May, Larry A.; and Hays, Norman W., to Bowser, Inc. Fluid pump having pulsing means and money accumulator. 3,587,808, Cl. 194-13.

Romer, Bendt Wegge: *See—*
Leffers, Hans Ulrik; and Romer, Bendt Wegge, 3,587,781.

Romero, Max A.; and Mikulec, Conrad S. Fire extinguisher with removable fusible link. 3,587,747, Cl. 169-26.

Rongier, Pierre. Commissariat a l'Energie Atomique Reference voltage generator for a temperature control programmer. 3,588,419, Cl. 219-493.

Roos, Jan P. Compact fluid heater. 3,587,532, Cl. 122-356.

Rootes Motors Limited: *See—*
Wyman, Howard John, 3,588,008.

Rorer, Donald R.: *See—*
Stone, Roger W.; and Rorer, Donald R., 3,587,200.

Rosati, James J.; and Boulton, Richard C., to Grace, W. R., & Co. Take-away fingers. 3,587,821, Cl. 198-22.

Rosen, Charles A., to Stanford Research Institute. Matrix multiplier for obtaining the dot product of two vectors. 3,588,486, Cl. 235-194.

Rosenbaum, Fred J., to Washington University. Swept frequency microwave generator. 3,588,704, Cl. 325-105.

Rosendall, Henry J., to Bissell Inc. Sweeper with inertia-operated combs. 3,587,127, Cl. 15-48.

Rosenkranz, Dieter; and Bous, Karl, to Plutts, Koecke & Co. Feed nozzle for transporting filamentary materials. 3,587,974, Cl. 239-423.

Rosenski, Julius R.: *See—*
Banathy, Eugene D.; Rosenski, Julius R.; and Sechrist, Claude Jerome, 3,588,391.

Rosner, Tobias S.: *See—*
Crisfield, Lloyd F.; and Rosner, Tobias S., 3,587,247.

Ross, Alexander Allan, to Fisons Limited. Spraying apparatus. 3,587,971, Cl. 239-155.

Ross, Austin: *See—*
Bartel, Karl; and Ross, Austin, 3,588,322.

Ross, David S., to Hydro-Clear Corporation. Apparatus and method of filtering solids from a liquid effluent. 3,587,861, Cl. 210-277.

Ross, Gene W.: *See—*
Kamm, Donald L.; and Ross, Gene W., 3,587,852.

Ross, Roger J., to Singer Company, The. Apparatus for simultaneous formation of overcasting and securing stitches in superposed fabric plies. 3,587,492, Cl. 112-162.

Ross, Sidney D.; and Frantz, Franklin D., to Sprague Electric Company. Coated impregnated capacitor. 3,588,643, Cl. 317-258.

Rossfelder, Andre M.; and Thorn, Bertram J., to Tetra Tech, Inc. Collector assembly for deep sea mining. 3,588,174, Cl. 299-8.

Rosshaupter, Erich: *See—*
Andrascek, Ernst; and Rosshaupter, Erich, 3,588,757.

Rotenburger Metallwerke GmbH: *See—*
Wehr, Georg; Gotze, Gotthold; and Heesch, Hans, 3,587,681.

Roth, Werner: *See—*
Zumkeller, Oskar; and Roth, Werner, 3,588,910.

Rothermel, William Fletcher, to Coulter Electronics, Inc. Liquid mixing and transfer apparatus and method. 3,588,053, Cl. 259-4.

Rotter, Friedrich, to Siegener Maschinenbau, G.m.b.H. Strip coiler. 3,587,274, Cl. 72-148.

Rouvre, Philippe A. R.; Pineau, Jean E. X.; Peroy, Francois; and Delayaction motor energizing control devices, to Regie Nationale des Usines Renault, and Automobiles Peugeot. . 3,588,657, Cl. 318-471.

Rovin, Herman; and Schiffmacher, Fred J., to Ivanhoe Research Corporation, mesne. Methods and apparatus for automatically registering and combining fabric workpieces. 3,588,087, Cl. 270-58.

Rowe International, Inc.: *See—*
Landis, Bruce B., 3,587,919.
Vollink, Gilbert J., 3,588,354.

Rowekamp, William H., to Shepherd, William F., Inc. Escrow assembly for a vending machine. 3,587,805, Cl. 194-2.

Rowland-Jones, Henry E., to Metal Signs and Nameplates (Proprietary) Limited. Workpiece locating devices. 3,587,380, Cl. 83-364.

Roy, Gerald L., to Armstrong Cork company. Heat marking and sensing for bottle injection. 3,587,855, Cl. 209-111.5

Royal Industries, Inc.: *See—*
Bennett, Marvin D., 3,587,236.

Royce, Frank A.: *See—*
Hammer, Herman J.; Heald, Sherman T.; and Royce, Frank A., 3,588,424.

Roylance, Byron D., to United States of America, Navy. Crystal filter circuit. 3,588,756, Cl. 333-72.

Rubber-Seal Products Company, Inc.: *See—*
Ellis, Roy T., 3,587,940.

Rubenstein, Robert Aron; and Schopp, James Conrad, to RCA Corporation. Apparatus for monitoring and controlling the concentration of powder particles in a mixture of powder and magnetic particles. 3,587,521, Cl. 118-7.

Rudd, Wallace C.: *See—*
Harriau, Robert R.; and Rudd, Wallace C., 3,588,426.

Rudmose, H Wayne; and Estes, Nelson N., to Tracor, Inc. Method and apparatus for testing hearing. 3,588,358, Cl. 179-1.

Rugaber, Robert H.: *See—*
Harris, Halbert M.; Headd, Franklin L.; Huber, Charles L.; Rugaber, Robert H.; and Tilly, Ralph R., 3,588,335.

Runyan, Walter Richard: *See—*
Alexander, Earl Glynn; and Runyan, Walter Richard, 3,587,166.

Ruof, Edgar J., to Goodyear Tire & Rubber Company, The. Brake temperature measuring system having one visual meter and one visual high temperature indicator. 3,587,317, Cl. 73-342.

Rusho, Frank W., to General Electric Company. Wideband composite frequency modulator. 3,588,747, Cl. 332-26.

Ruspino, James G.: *See—*
Braga, Albert T.; and Ruspino, James G., 3,588,213.

Russell, Edward J.; Brown, Gaylord W.; Adams, Gary A.; and Dorman, Denis J., to Brown Machine Company of Michigan, Inc. Mechanism for removing containers from mandrels. 3,587,816, Cl. 198-20.

Russell, Lowell L.; and Bender, Donald E., to Olin Mathieson Chemical Corporation. Automatic fluid injector. 3,587,782, Cl. 184-7.

Russo, Frank A. Method for continuously casting metal sheet or strip. 3,587,711, Cl. 164-83.

Rustin, Rudolph B., Jr., to Overton Company. Collapsible pallet bin. 3,587,903, Cl. 217-48.

Rutz, Robert E.: *See—*
Anderson, Emmett R.; and Rutz, Robert E., 3,588,465.

S & C Electric Company: *See—*
Bernatt, Joseph, 3,588,406.

Sabee, Reinhardt N. Reinforced diaper. 3,587,579, Cl. 128-287.

Sadler, Fred S.: *See—*
Nash, William H.; Lapp, John; and Sadler, Fred S., 3,588,644.

Saenger, John F., Jr.; Enis, Allan; and McGinty, Harry C., to Union Carbide Corporation. Dual electrode torch for manual welding. 3,588,464, Cl. 219-130.

said Beach: *See—*
Beach, John Myers; Oglesbee, Edgar Crain; White, Arthur Roger; Ziegler, George Stephen; and Cecil, Harry Hamilton, 3,587,788.

Sakai, Yasuhide; Takagi, Yoshinori; and Atanabe, Masahiro, to Matsushita Electric Industrial Co., Ltd. Automatic tuning receiver. 3,588,706, Cl. 325-417.

Salmet, Gaston Raoul. Radio compass and means for controlling its motor. 3,588,900, Cl. 343-117.

Sanders Associates, Inc.: *See—*
Gabor, William D., 3,588,875.
Labaugh, Kenneth D., 3,588,843.

Sandor, Bela, to General Electric Corporation. Latch operating arrangement. 3,587,259, Cl. 70-218.

Sandusky Foundry & Machine Company: *See—*
Bade, Walter H., 3,587,720.

Sano, Kazuo: *See—*
Shimotsuma, Teruo; Mori, Toshihiro; Sano, Kazuo; and Miyashita, Tsuneo, 3,588,067.

Santoni & C.-S.p.A.: *See—*
Vincoli, Armando, 3,587,251.

Sarasota Engineering Co., Inc.: *See—*
Wilcox, Merton, 3,588,806.

Sargeant, Elaine Waller: *See—*
Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin, 3,588,085.

Sarka, Albert J., to Harris Intertype Corporation. Method and apparatus for indicating groups of articles. 3,587,413, Cl. 93-93.

Sarto, Jorma O., to Chrysler Corporation. Engine exhaust recirculation. 3,587,541, Cl. 123-119.

Sato, Hosei, to Matsushita Electric Industrial Co., Ltd. Toaster. 3,588,389, Cl. 191-12.2

Sato, Matsuo: *See—*
Fuji, Takashi; and Sato, Matsuo, 3,587,300.

Satomi, Tadaatsu: *See—*
Oguma, Tomio; Nishimura, Sadanori; and Satomi, Tadaatsu, 3,587,354.

Satriano, Nicholas M.: *See—*
Benjaminson, Morris A.; Satriano, Nicholas M.; and Katz, Irwin J., 3,587,323.

Satterfield, Marion M., to United States of America, Atomic Energy Commission. Nonblocking preamplifier. 3,588,729, Cl. 330-207.

Satterwhite, Raymond D. Obstetrical instrument for rupturing the amniotic. 3,587,591, Cl. 128-361.

Sauer, Gerald R. Lawn edger attachment for a power saw. 3,587,749, Cl. 172-15.

Sauna International, Inc.: *See—*
Brown, George M., 3,587,141.

Sauter, August, KG: *See—*
Ast, Adolf, 3,587,762.

Savage, W. J., Company, Inc.: *See—*
Ellis, Gus M., Jr.; and McCoy, William J., Jr., 3,588,177.

Savino, Henry C., to Westinghouse Electric Corporation. Zone demand elevator system. 3,587,786, Cl. 187-29.

Sawada, Kunio; Matsuda, Yuzo; and Kuwabara, Hiroshi, to Nippon Electric Company, Limited. Methods and apparatus for making wire type ultrasonic delay lines. 3,588,755, Cl. 333-30.

Sayre, Jack L.; and Pace, Robert E., to United States of America, Navy. Recovery snare. 3,588,161, Cl. 294-19.

Scaravelli, Angelo. Device for tightening and clamping a hose clamp on a tubular body or the like. 3,587,142, Cl. 24-268.

Schaal, Doyle H., to Continental Oil Company. Apparatus for indicating graphic coordinate values. 3,588,885, Cl. 340-347.

Schaefer, Edward E., to Soaker hose support clamp. . 3,588,012, Cl. 248-80.

Schaefer, Manfred: *See—*
Klein, Horst; and Schaefer, Manfred, 3,587,366.

Schaefer, Robert H., to General Motors Corporation. Transmission and shift control system. 3,587,355, Cl. 74-868.

Schafft, Hugo W., to Motorola, Inc. Transducer having spaced apart oppositely flexing piezoelectric members. 3,588,381, Cl. 179-110.

Schafft, Hugo W., to Motorola, Inc. Pre-stressed piezoelectric audio transducer. 3,588,552, Cl. 310-8.7

Schanche, Tor: *See—*
Kilgore, Lee A.; Fergestad, Ragnvald; and Schanche, Tor, 3,588,557.

Schaper, Donald W.: *See—*
Forster, Klaus W.; and Schaper, Donald W., 3,587,880.

Scheidweiler, Andreas, to Cerberus AG. Test of parallel alarm units. 3,588,892, Cl. 340-410.

Scher, Harry, to Wells Television, Inc. Hospital communication system. 3,588,336, Cl. 178-6.8

Schiff, Peter Paul. Mechanical ventricular assistance assembly. 3,587,567, Cl. 128-24.5

Schiffmacher, Fred J.: *See—*
Rovin, Herman; and Schiffmacher, Fred J., 3,588,087.

Schindler, Herbert, to Schon & Cie. Gesellschaft mit beschrankter Haftung, Firma. Supply line for thermoplastic cement in lasting machines. 3,587,655, Cl. 138-120.

Schipper, Dennis J.: *See—*
Dugge, Richard H.; Schipper, Dennis J.; and Smith, Garth R., 3,587,834.

Schlafly, Hubert J., Jr., to Teleprompter Corporation. Security monitoring system with tamperproof cabinet. 3,588,866, Cl. 340-276.

Schlecht, Karl, to Putzmeister GmbH. Slurry pump arrangement. 3,588,294, Cl. 417-532.

Schleifenbaum, Gerhard: *See—*
Koennecke, Wolfgang; and Schleifenbaum, Gerhard, 3,588,412.

Schloemann Aktiengesellschaft: *See—*
Bammert, Wilhelm; and Kaiser, Hans-Peter, 3,587,138.
Kost, Erwin, 3,587,294.

Schlueter, Francis Edward, to Deere & Company. Vehicle-mounted receptacle. 3,588,136, Cl. 280-5.

Schlumberger overseas Messgeratebau und Vertrieb GmbH: *See—*
Hoeffer, Herbert; Knirsch, Herbert; and Rehm, Siegfried, 3,588,731.

Schluter, Wilhelm; and Thonigs, Rolf, to Eisenwerk Rothe Erde GmbH. Pressure medium operable drive for giant antifriction bearings. 3,587,402, Cl. 91-498.

Schmidt, Alfred, Ing.: *See—*
Hirt, Walter, 3,587,182.
Hirt, Walter, 3,588,155.
Schmidt, Alfred, Jr., 3,587,751.

Schmidt, Alfred, Jr., to Schmidt, Alfred, Ing. Snowplough with adjustable blade. 3,587,751, Cl. 172-264.

Schmidt, Heinrich K., to Roller Bearing Company of America. Sealed self-aligning plain bearing. 3,588,201, Cl. 308-36.1

Schmidt, Ross D., to Honeywell, Inc. Gas turbine engine control apparatus. 3,587,230, Cl. 60-39.28

Schmidt, Wolfgang, to U.S. Philips Corporation. Arrangement of a high vacuum electronic discharge tube provided with a getter ion pump operating in magnetic fields. 3,588,563, Cl. 313-7.

Schneider, Jack W.: *See—*
Schneider, Kurt P., 3,587,471.

Schneider, Jos, & Co.: *See—*
Woltche, Walter; and Elle, Klaus, 3,588,229.

Schneider, Kurt P., 1/3 to Schneider, Jack W. Rapid transit system. 3,587,471, Cl. 104-23.

Schneider, Quentin L., to General Time Corporation. Electronic pulse source for elapsed time indicator. 3,588,621, Cl. 317-142.

Schnellman, Oscar; and Stier, Henry Willy, to Carmet Company. Automatic profile grinding machine with an indexing mechanism. 3,587,192, Cl. 51-121.

Schnerb, Pierre, to Association des Durriers en Instruments de Precision. Apparatus for determination of the orientation of a moving member, particularly a drilling head. 3,587,176, Cl. 33-205.

Schoen, Gerald L., to Badger Northland Inc. Material distributor. 3,587,827, Cl. 198-106.

Schoenwald, Waldo W.; and Farstad, Virgil L. Combined roundabout and teeter-totter. 3,588,100, Cl. 272-30.

Scholl, Peter K.: *See—*
Gross, Robert D.; Masel, Marvin; and Scholl, Peter K.,3,588,880.

Scholtz, Myndert T., to Toronto Coppersmithing Company Limited. Continuous blender. 3,588,052, Cl. 259-3.

Schon & Cie. Gesellschaft mit beschrankter Haftung, Firma: *See—*
Schindler, Herbert, 3,587,655.

Schopp, James Conrad: *See—*
Rubenstein, Robert Aron; and Schopp, James Conrad,3,587,521.

Schott, Clifford J.: *See—*
Robinson, Kennard E.; and Schott, Clifford J.,3,588,813.

Schrader, Gert: *See—*
Klein, Hans Christof; Beller, Hans; and Schrader, Gert,3,588,810.

Schrenk, Oskar: *See—*
Nottnagel, Wolf; and Schrenk, Oskar,3,588,370.

Schreuer, Walter; Neumann, Leopold; and Rigby, Sherman, to Gordon Engineering Company. Variable frequency generator combining outputs of two phase locked loops. 3,588,730, Cl. 331-2.

Schrewe, Hans; Kobusch, Helmut; Liestmann, Wolf-Dietrich; Carius, Wolfhard; Vom Ende, Hans; Frenken, Klaus; and Vogt, Gerd, to Mannesmann Aktiengesellschaft. Molten metal supply apparatus for preventing oxide contamination in continuously cast steel products. 3,587,719, Cl. 164-281.

Schroeder, Earle E.: *See—*
Koehlke, Earl L.; Lipe, Bruce R.; and Schroeder, Earle E.,3,588,009.

Schroen, Walter H., to Texas Instruments, Incorporated. Superconducting tunneling barriers. 3,588,777, Cl. 338-32.

Schubert, Dale W.: *See—*
Suter, Xaver; Schubert, Dale W.; and Ezekiel, Frederick D.,3,588,004.

Schuemann, Wilfred C., to Hercules Incorporated. Fluid-jet deflection type instrument having a diaphragm type pump with piezoelectric actuation. 3,587,328, Cl. 73-516.

Schulein, Joseph: *See—*
Schulein, Joseph, 3,588,828.

Schulein, Joseph, and: *See—*
Schulein, Joseph, 3,588,889.

Schulein, Joseph, 50% to Hayward, Dutton H., trustee of the Hilda Trusts 1-9, inclusive, 50% to Schulein, Joseph, and Schulein, Margaret A. Signaling system responsive to pulses within an amplitude range. 3,588,828, Cl. 340-169.

Schulein, Joseph, 50% to Haywood, H. Dutton, 50% to Schulein, Joseph, and Schulein, Margaret A. Electrical signaling system including selectively variable impedance device. 3,588,889, Cl. 340-409.

Schulein, Margaret A.: *See—*
Schulein, Joseph, 3,588,828.
Schulein, Joseph, 3,588,889.

Schultz, George; and Dziki, Michael, to Industrial Shoe Machinery Corporation. Apparatus for dispensing thermoplastic material. 3,587,930, Cl. 222-146.

Schultze, Harold E., to General Motors Corporation. Cylinder end assembly for shock absorber. 3,587,790, Cl. 188-100.

Schulz Tool and Manufacturing Co.: *See—*
Hardison, Artson P., 3,587,622.
Hieber, Ellsworth E.; Taquino, Thomas P.; and Hillery, Frank Edward, 3,587,678.

Schuman, Ralph H., to Warner & Swasey Company, The. Time and speed modulated clutch and brake. 3,587,798, Cl. 192-12.

Schumann, Erwin; and Kuhn, Rudolf, to Deutsche Gold-und Silber-Scheideanstalt vormals Roessler. Furnace installation for continuously descaling a metal band. 3,587,149, Cl. 29-81.

Schwartz, Harold L., to Burroughs Corporation. Semiconductor pulse generator including logic gates, ramp generator and threshold detector for providing controlled-width rectangular pulses. 3,588,543, Cl. 307-265.

Schwartz, Josef: *See—*
Probstein, Ronald F.; and Schwartz, Josef,3,587,859.

Schweicher, Wolfgang: *See—*
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Wasser, Willi; Browatzki, Kurt; Friedsam, Joseph; and Heidenreich, Max,3,587,962.

Schwenk Sheet Metal Works, Inc.: *See—*
Dowdall, Donald H.; Friley, James W.; and Sophy, Daniel A., 3,587,162.

SCM Corporation: *See—*
Csaba, Elmer L.; and Engel, Edward W., 3,588,106.
Engel, Edward W., 3,588,097.
Guzak, John, Jr., 3,588,320.

Scott, John E., to United States of America, Navy, mesne. Forward-backward digital counter circuit. 3,588,475, Cl. 235-92.

Scott, Richard: *See—*
Bartlett, William F.; Randmere, Uno; and Scott, Richard,3,588,833.

Scott-Scott, John Lanfear; and Sweetland, David John, to Rolls-Royce Limited. Low specific speed rotary pump. 3,588,266, Cl. 415-11.

Scully, Charles Norman: *See—*
Escallier, Edward Andrew; and Scully, Charles Norman,3,587,291.

Scully, Richard F., to International Business Machines Corporation. Data gap responding apparatus. 3,588,855, Cl. 340-174.1

Seccombe, Robert J.; and Willson, Jack E., to Ingersoll-Rand Company. Apparatus and method for ball sizing holes in workpieces. 3,587,269, Cl. 72-75.

Sechrist, Claude Jerome: *See—*
Banathy, Eugene D.; Rosenski, Julius R.; and Sechrist, Claude Jerome,2,588,391.

Sederberg, George W., to Cincinnati Milacron Inc. Material cutting machine having reciprocating cutting blade adapted to enter material without an entrance cut. 3,587,381, Cl. 83-424.

Seelandt, Karl H., to Sola Basic Industries, Inc. Electrically heated vessel enclosed car bottom furnace system. 3,588,305, Cl. 13-1.

Seeling, Lewis R.: *See—*
Sendzimar, Michael G.; and Seeling, Lewis R.,3,587,279.

Seibel, Arthur, to Bergische Stahl-Industrie. Reel construction. 3,587,992, Cl. 242-78.1

Seidel, Harold, to Bell Telephone Laboratories, Incorporated. Imaged impedance through frequency conversion. 3,588,727, Cl. 330-34.

Seismograph Service Corporation: *See—*
Lerwill, William Edward, 3,588,802.

Seisomograph Service Corporation: *See—*
Blossom, James H., 3,588,522.

Seitel, Heinz: *See—*
Bremshey, Fritz; and Seitel, Heinz,3,587,600.

Sell, Robert L.: *See—*
Bandy, William J., Jr.; and Sell, Robert L.,3,587,324.

Sellari, Daniele, Jr., to International Telephone and Telegraph Corporation. Automatic remote meter reading over telephone line. 3,588,357, Cl. 179-2.

Semar, Harold W.: *See—*
Ortolano, Ralph J.; Welch, William P.; and Semar, Harold W.,3,588,278.

Sendt, Alfred R., to Owens-Illinois, Inc. Apparatus for the detection of checks in glass containers. 3,588,258, Cl. 356-240.

Sendzimar, Michael G.; and Seeling, Lewis R., to Sendzimir, T., Inc. Fast response screwdown system for rolling mills. 3,587,279, Cl. 72-240.

Sendzimir, T., Inc.: *See—*
Sendzimar, Michael G.; and Seeling, Lewis R., 3,587,279.

Senften, David A.: *See—*
Hunter, Lee; and Senften, David A.,3,587,325.

Sennowitz, Kurt H., to Elox Inc. Gap open circuit protective system for electrical discharge machining. 3,588,428, Cl. 219-69.

Sentralinstitutt for Industriell Forskning: *See—*
Bjor, Hakon Einar, 3,588,531.

Service d'Exploitation Industrielle des Tabacs et des Allumettes:*See—*
Bornstein, Rene; and Dubus, Gerard, 3,587,817.

Service Engineering, Inc.: *See—*
Byrum, Grover E.; Doty, Myron L.; Hendricks, Charles O.; and Jennings, Floyd Robert, 3,587,833.

Seta, Yoichi: *See—*
Kihara, Yasukane; Moriyama, Ushimatsu; and Seta, Yoichi,3,588,625.

Severson, Palmer T.: *See—*
Holzer, John M.; and Severson, Palmer T.,3,587,826.

Seya, Atsumi: *See—*
Akuta, Tomohiko; and Seya, Atsumi,3,587,758.

Shafco Industries, Inc.: *See—*
Shaffer, Donald U., 3,587,734.

Shaffer, Donald U., to Shafco Industries, Inc. Adapter for converting a stationary blowout preventer to a rotary blowout preventer. 3,587,734, Cl. 166-0.5

Shannon, John K. Battery post terminal clamp. 3,588,790, Cl. 339-230.

Shapiro, George: *See—*
Buckingham, Arthur G.; Miller, James A.; and Shapiro, George,3,588,000.

Shapland, James T.: *See—*
Lanatti, Joseph H.; and Shapland, James T.,3,587,945.

Sharman, John C., to G.K.N. Engineering Limited. Presses. 3,587,288, Cl. 72-450.

Shattock, Charles F. B., to Westinghouse Brake and Signal Company, Limited. Control means for braking devices. 3,588,188, Cl. 303-21.

Shaver, William R.: *See—*
Ferris, Ray L.; Shaver, William R.; and Dohne, Jan W.,3,587,477.

Shaver, William W.: *See—*
Millar, Alexander E. J.; Shaver, William W.; and Mrotzek, Richard,3,587,900.

Shea, Frank J. Security vault. 3,587,485, Cl. 109-48.

Shell Oil Company: *See—*
Baier, William E., Jr., 3,587,775.
Brink, Robert E., 3,588,537.
Christensen, Alton O., 3,588,844.
Luke, Robert R.; Robinson, Marshall M.; and Thomson, Kenneth, 3,588,911.
Vining, Thomas F., 3,588,580.
Vondrak, Mary Frances, 3,588,183.

Wittenwyler, Clifford V.; and Torrest, Robert S., 3,587,742.

Shepherd, William F., Inc.: *See—*
Rowekamp, William H., 3,587,805.

Sherwin-Williams Company, The: *See—*
Ellms, Robert W.; and Abraham, Edward D., 3,587,714.
Miller, Leon F.; and Herbruggen, Henry J., 3,587,709.

Sherwood, John F. Expanding arbor-collet. 3,587,371, Cl. 82-44.

Shichman, Harold: *See—*
Lynes, Dennis J.; Shichman, Harold; and Waaben, Sigurd G.,3,588,849.

Shikata, Toshio: *See—*
Okamoto, Harumichi; Shikata, Toshio; and Magaribuchi, Kazuo,3,588,028.

Shiki, Haruo; and Taniya, Takaaki, to Nippon Electric Company, Limited. Failure compensating drop channel microwave radio relay system. 3,588,700, Cl. 325-2.

Shiley, Donald P. Prosthetic sutureless heart valves and implant tools therefor. 3,587,115, Cl. 3-1.

Shimanckas, William J., to Outboard Marine Corporation. Marine propulsion device with split drive shaft. 3,587,510, Cl. 115-35.

Shimizu, Harry H., to Kruse Electronics. Output coupler for a radio frequency oscillator. 3,588,753, Cl. 333-21.

Shimomura, Kikuo: *See—*
Ohta, Kazuhiro; and Shimomura, Kikuo,3,587,912.

Shimotsuma, Teruo; Mori, Toshihiro; Sano, Kazuo; and Miyashita, Tsuneo, to Nippon Kokan Kabushiki Kaisha. Control apparatus for blast furnace operation. 3,588,067, Cl. 266-25.

Shintani, Sotokichi: *See—*
Kawai, Kazuo; Shintani, Sotokichi; and Yanagidaira, Hidetaka,3,588,349.

Shintron Company, Inc.: *See—*
Asano, Shintaro; and Baxter, Larry K., 3,588,240.

Shiosaki, James T., to Honeywell Inc. Constant writing rate display control apparatus. 3,588,871, Cl. 340-324.

Shippy, William J., to Pyronetics, Inc. Normally-open explosive-operated valve, and combination thereof with a normally- closed valve. 3,587,601, Cl. 137-67.

Shoemaker, Edwin J.: *See—*
Knabusch, Edward M.; and Shoemaker, Edwin J.,3,588,170.

Shofner, Fred M., to University of Tennessee Research Corporation, The. Programmable electro-mechanical oscillator. 3,588,656, Cl. 318-282.

Shomo, Robert D., to Develco Corporation. Versatile stamped shaft collar. 3,588,152, Cl. 287-52.03

Shook, Carl G.; Anderson, Robert F.; and Macano, Samuel J., to General Signal Corporation. Digital commaless code remote control system. 3,588,825, Cl. 340-163.

Shore, Sidney X. Paper clip container. 3,587,835, Cl. 206-1.

Shriner, Walter. Air pollution reduction system. 3,587,210, Cl. 55-103.

Shtyryaev, Konstantin Andreevich: *See—*
Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich,3,587,673.

Shuttleworth, James J. Vacuum head for stacking objects. 3,587,206, Cl. 53-249.

Shuttleworth, James J. Flap breaker and holder. 3,587,207, Cl. 53-381.

Sibany Manufacturing Corporation: *See—*
Miller, Robert P.; Miller, Marvin; and Bailey, Stephen P., 3,588,581.

Sibley, William J., to National Blank Book Company, Inc. Photograph album leaf construction. 3,587,187, Cl. 40-159.

Siegener Maschinenbau, G.m.b.H.: *See—*
Rotter, Friedrich, 3,587,274.

Siegmund, Walter P., to American Optical Corporation. Fiber optical multifibers and devices formed thereof. 3,588,221, Cl. 350-96.

Siemens Aktiengesellschaft: *See—*
Andrascek, Ernst; and Rosshaupter, Erich, 3,588,757.
Detsch, Heinrich, 3,588,691.
Hoscheler, Hans, 3,588,436.
Kreutzkampf, Franz, 3,588,290.
Nottnagel, Wolf; and Schrenk, Oskar, 3,588,370.
Rapp, Gunther, 3,588,850.
Ulmer, Wolfgang, 3,588,750.

Sierra Electric, Inc.: *See—*
Gaines, Jack H., 3,588,489.

Sierracin Corporation, The: *See—*
Levin, Berton P., 3,587,167.

Sievenpiper, Ward, 'Automatic' Sprinkler Corporation of America. Piston bearing. 3,588,134, Cl. 277-235.

Signetics Corporation: *See—*
Hayden, John H., 3,588,633.

Silfverskiold, Lennart. Bulk container with removable yoke. 3,587,697, Cl. 150-0.5

Silvers, Jerry J., to Kidde, Walter, & Company, Inc. Fluorescent lamp ballast and thermal protective means therefor. 3,588,595, Cl. 315-127.

Simmonds Precision Products, Inc.: *See—*
Akeley, Lloyd T., 3,588,404.
Lobdell, Stephen L.; and Gamble, Ralph S., 3,587,322.
Parkinson, James R.; and Gamache, Robert W., 3,587,305.

Simon, Horst, to Eastman Kodak Company. Device for automatically cleaning electrical contact surfaces in photographic apparatus. 3,587,423, Cl. 95-11.

Simon-Carves Limited: *See—*
Martindale, Allan; Allanson, John T.; and Parr, Bryan R., 3,587,240.

Simons, Sanford L. Coagulation and viscosity test apparatus and method. 3,587,295, Cl. 73-64.1

Simpkins, Frederick W., to Alden Research Foundation. Graphic scanning apparatus with flexible optical fibres. 3,588,514, Cl. 250-227.

Simplex Wire and Cable Company: *See—*
Hutchins, Loren H., Jr., 3,588,317.

Sinar AG Schaffhausen: *See—*
Koch, Karl, 3,587,432.

Singer Company, The: *See—*
Daman, Louis Fawcett, 3,587,491.
Dubas, Alexander, 3,588,092.
Ivanko, Michael F.; and Ketterer, Stanley J., 3,587,493.
Ivanko, Michael F., 3,587,494.
Johnson, Ralph E., 3,587,495.
Klein, Richard G.; Thorson, Sheldon E.; and Morris, John C., 3,587,453.
Leiter, Leigh D.; and Redpath, Richard J., 3,588,096.
Morris, John C., 3,587,457.
Ragen, Robert A., 3,588,841.
Ross, Roger J., 3,587,492.
Smith, Henry E.; and Wilcox, Donald C., 3,587,811.
Weisz, William, 3,587,498.

Singer-General Precision, Inc.: *See—*
Dell, Harold R.; and Florence, Judit K., 3,588,847.
Gross, Robert D.; Masel, Marvin; and Scholl, Peter K., 3,588,880.

Singh, Harbans. Spectral balancing filter for fluorescent sources. 3,588,215, Cl. 350-1.

Sinigoi, Roger A.: *See—*
Des Marais, John; and Sinigoi, Roger A.,3,588,210.

Sinski, Henry A.: *See—*
McKinney, Donald W.; and Sinski, Henry A.,3,587,145.

Siverson, Garfield, C.: *See—*
Hill, Halbert R.; and Siverson, Garfield, C.,3,587,687.

Sivilotti, Olivo G., to Alcan Research and Development Limited. Automatic thermal crown control of strip mill rolls. 3,587,265, Cl. 72-8.

Siviy, George, to Westinghouse Electric Corporation. Switchgear with position indicating means. 3,588,398, Cl. 200-50.

Siwko, Karol; and Thomas, Joseph Edward, to Sylvania Electric Products, Inc. DC blanking and image reproducer bias adjusting circuitry. 3,588,327, Cl. 178-5.4

Sjotun, Kyrre G.: *See—*
Sturlason, Leif V.; and Sjotun, Kyrre G.,3,588,284.

Skinner, Robert T. J., to Lucas, Joseph, (Industries) Limited. Control systems for hydraulic pumps. 3,588,286, Cl. 417-218.

Slade, Peter M., to Caterpillar Tractor Company. Auxiliary turbine braking system for free turbine gas turbine engines. 3,587,766, Cl. 180-66.

Slansky, Robert B. Adjustable crucible former for dental molding flask. 3,587,722, Cl. 164-376.

Slocum, Jack D.: *See—*
Potter, Roderick B.; and Slocum, Jack D.,3,587,126.

Slugantz, Thomas E., to Texas Instruments, Incorporated. Protective apparatus. 3,588,603, Cl. 317-9.

Slusher, Emmet G. Earth boring apparatus. 3,587,755, Cl. 173-159.

Smirnov, Konstantin Dmitrievich: *See—*
Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich,3,587,673.

Smirnov, Oleg Alexandrovich; Zubkov, Vyacheslav Ivanovich; and Danilov, Viktor Petrovich. Device for applying selective and general hypothermy to and reheating of human body through the common integuments thereof. 3,587,577, Cl. 128-254.

Smirnov, Vladimir Ivanovich; Danilov, Edvard Grigorievich; Ariev, Grigory Evseevich; Kovalenko, Maria Fedorovna; Shtyryaev, Konstantin Andreevich; Smirnov, Konstantin Dmitrievich; Kush, Pavel Pavlovich; Petrov, Jury Vyacheslavovich; Belozerov, Anatoly Vasilievich; and Burekhin, Viktor Vasilievich, to Leningradskoe Electromashinostroitelnoe Obiedinenie 'Electrosila' I.M.S.M. Kirova. Installation for cutting electric wires and skinning electric wire ends. 3,587,673, Cl. 140-1.

Smith, Bob L., to Dmeter, I. V., Inc. Flow meter for parenteral solutions. 3,587,313, Cl. 73-209.

Smith, Frank B. Cut-off device for telephone transmitter. 3,588,387, Cl. 179-167.

Smith, Fred T., to Barber-Greene Company. Jackknife type conveyor for reclaiming material. 3,587,825, Cl. 198-36.

Smith, Garth R.: *See—*
Dugge, Richard H.; Schipper, Dennis J.; and Smith, Garth R.,3,587,834.

Smith, George B.; and Hirsch, John C., Jr., to Engel Equipment, Inc. Conveyorized edge processing apparatus for duct-making and the like. 3,587,273, Cl. 72-133.

Smith, Grant H.: *See—*
Spokas, Romas B.; and Smith, Grant H.,3,587,537.

Smith, Henry E.; and Wilcox, Donald C., to Singer Company, The. Platen power drive for line spacing, vertical tabulation and form-feed spacing. 3,587,811, Cl. 197-114.

Smith, Jerry R.; and Laner, Sigmond Harvey, to Becco, Inc. Pilferproof package. 3,587,837, Cl. 206-45.14

Smith, Leward N.: *See—*
Morey, Norval K.; and Smith, Leward N.,3,587,685.

Smith, Oliver J.: *See—*
Blazek, Donald F.; Bury, Elmer J.; Moore, Robert W.; and Smith, Oliver J.,3,587,419.

Smith, Richard A., to Bell Telephone Laboratories, Incorporated. Fast fourier transform processor. 3,588,460, Cl. 235-156.

Smith, Stanley G., to Du Pont de Nemours, E. I., and Company. Screw press for drying elastomeric materials. 3,587,450, Cl. 100-117.

Smith, Stanley K., to Black and Decker Manufacturing Company, The. Fluidic governor for air tools. 3,587,752, Cl. 173-12.

Smith, Theodore M. No tool detection system and tool holder. 3,587,361, Cl. 77-5.

Smiths Industries Limited: *See—*
Anderson, Edward William, 3,588,422.

Snowman, Lawrence R., to General Electric Company. Radiation analysis apparatus having an absorption chamber with partially reflective mirror surfaces. 3,588,496, Cl. 250-43.5

Snyder, Warren E.: *See—*
Hussey, Russell B.; Kimberley, John A.; and Snyder, Warren E.,3,587,547.

Soaker hose support clamp: *See—*
Schaefer, Edward E., 3,588,012.

Sobchak, Frank L.: *See—*
Brouwer, Frans; and Sobchak, Frank L.,3,588,342.
Brouwer, Frans; and Sobchak, Frank L.,3,588,343.

Societa Italiana Telecommunicazioni Siemens: *See—*
Formenti, Ferdinando; and Valbonesi, Giuseppe, 3,588,366.

Societa Italiana Telecommunicazioni Siemens S.p.A.: *See—*
Dal Monte, Giorgio; and Motolese, Francesco, 3,588,371.

Societa Italiana Telecomunicazioni Siemens S.p.A.: *See—*
Vicentini, Arnaldo; and Sonaglioni, Demetrio, 3,588,539.

Societa Metallurgica Italiana: *See—*
Vacca, Michelangelo, 3,587,287.

Societe Alsacienne de Constructions Mecaniques de Mulhouse: *See—*
Juillard, Yves; and Geiger, Bernard, 3,587,663.

Societe Anonyme Automobiles Citroen: *See—*
Grosseau, Albert, 3,587,340.

Societe anonyme dite: A. Thibeau & Cie: *See—*
Thibeau, Jacques, 3,587,139.

Societe Anonyme: Societe Alsacienne de Constructions Atomiques de Telecommunication et d'Electronique (ALCATEL):*See—*
LaSalle, Michel Marie Joseph; and Jourdan, Gerard Charles Maurice, 3,588,821.

Societe de Telecommunications Electronique, Aeronautique et Maritime 'T.E.A.M.':*See—*
Quenet, Christian Fernand Michel; and Rochereau, Jacques Louis Jean-Pierre, 3,588,339.

Societe des Forges et Ateliers du Creusot: *See—*
Nectoux, Andre, 3,588,049.

Societe d'Etudes de Machines Speciales Societe Anonyme:*See—*
Chambon, Louis Jean, 3,587,460.

Societe d'Etudes et de Development des Aeroglisseurs Marins Terresters et Amphibies S.E.D.A.:*See—*
Faure, Marc Henri Jean, 3,587,771.

Societe d'Optique, Precision, Electronique et Mecanique 'Sopelem':*See—*
Llop, Helenio, 3,587,420.

Societe Generale de Constructions Electriques et Mecaniques (Alsthom): *See—*
Alexandre, Philippe, 3,587,625.

Societe Generale de Constructions Electriques et Mecaniques: *See—*
Burnier, Pierre, 3,588,312.

Societe Industrielle Pour la Diffusion d'Equipment et de Material 'Sidemat':*See—*
Lherault, Jean Andre, 3,587,926.

Societe Rhodiaceta: *See—*
Buzano, Michel, 3,587,221.

Sohn, Frank M., to RCA Corporation. Rectangular shadow mask type color picture tube with barrel shaped mask frame. 3,588,568, Cl. 313-85.

Sola Basic Industries, Inc.: *See—*
Seelandt, Karl H., 3,588,305.

Solartron Electronic Group Limited, The: *See—*
Ormiston, Peter Thomas, 3,588,108.
Quereshi, Umar; and Fortescue, Thomas Richard, 3,588,884.

Solitron Devices, Inc.: *See—*
Harrow, Charles Richard, 3,587,551.

Solvay, Henri: *See—*
Solvay, Jean; and Solvay, Henri,3,588,696.

Solvay, Jean; and Solvay, Henri. Devices for monitoring a physical quantity. 3,588,696, Cl. 324-121.

Sonaglioni, Demetrio: *See—*
Vicentini, Arnaldo; and Sonaglioni, Demetrio,3,588,539.

Sonneville, Roger Paul. Apparatus for the mass-production of moulded concrete elements. 3,587,143, Cl. 25-41.

Sonoco Products Company: *See—*
Cunningham, McCleery B.; Woods, Auburn, Jr.; and Dunlap, Charles K., Jr., 3,587,656.

Sonoda, George Y.: *See—*
Linton, Richard H.; and Sonoda, George Y.,3,588,846.

Sony Corporation: *See—*
Uemura, Saburo; and Yanagisawa, Yuzuru, 3,588,571.

Sophy, Daniel A.: *See—*
Dowdall, Donald H.; Friley, James W.; and Sophy, Daniel A.,3,587,162.

Sorbie, Thomas B., to Owens-Illinois, Inc. Glass container inspecting apparatus. 3,587,815, Cl. 198-19.

Sorensen, Neal Edwin: *See—*
Bailey, Robert Charles; Eppard, Maurice William; Estes, Harry Albert; Higgins, Jerry Allen; James, Glen Stuart; Montillon, Henry Aldrich; Myring, Verne Vincent; Robertson, Orville Herbert; Sargeant, Elaine Waller; and Sorensen, Neal Edwin,3,588,085.

Sorensen, Robert P., to Anderson Bros., Manufacturing Company. Conveyor with interchangeable receivers. 3,587,829, Cl. 198-131.

Sorenson, Gerald T., to Systems Design Company, Inc. Method of manufacturing a pressurized fluid control valve. 3,587,156, Cl. 29-156.7

Sorkin, Morris; and Lindstrom, Gary, to TRW Inc. Phase synchronization system. 3,588,703, Cl. 325-58.

Space/Defense Corporation: *See—*
Foster, Donald L.; and Williams, Lenord, 3,587,438.

Spaeth, Irvin J., to Evans Products Company. Railway brake structure. 3,587,792, Cl. 188-243.

Spanke, Edwin A.: *See—*
Carrieri, Louis F.; and Spanke, Edwin A.,3,587,135.

Spara, Otto Alvar, to Avesta Jernoerks Aktiebolag. Machine for dyeing textile material. 3,587,256, Cl. 68-177.

Speckhart, Bernard S.: *See—*
Weiss, Morton A.; and Speckhart, Bernard S.,3,587,473.

Spectrospin AG: *See—*
Tschopp, Werner; and Keller, Toni, 3,588,676.

Speedrack Inc.: *See—*
Konstant, Anthony N., 3,587,483.

Spencer, Alexander; Blake, Alan Francis; and Burns, David Guthrie, to Gestetner Limited. Thermographic stencil. 3,587,459, Cl. 101-128.3

Spencer, Arthur M.; Anderson, Arthur L.; and Dysart, Gordon R., to Western Company of North America, The. Fracturing of subsurface formations. 3,587,744, Cl. 166-299.

Sperry Rand Corporation: *See—*
Connett, Donald C.; and Whited, Arthur R., Jr., 3,587,403.
Fleming, Robert F., Jr.; and Riggs, Robert F., 3,588,803.
Godel, Siegfried; and Miller, Lester F., 3,587,444.
Wolff, Martin J., 3,587,596.

Sperry Sun Well Surveying Company: *See—*
Lindsey, James M., 3,588,908.

Spiwak, Robert R.: *See—*
Copeland, John A., III; and Spiwak, Robert R.,3,588,742.

Spokas, Romas B.; and Smith, Grant H., to Borg-Warner Corporation. Temperature modulated variable speed drive. 3,587,537, Cl. 123-41.12

Spotnails, Inc.: *See—*
Keck, Robert H.; and Goode, James K., Jr., 3,587,842.

Sprague Electric Company: *See—*
Cooper, Alan G., 3,588,626.
Fabricius, John H., 3,588,640.
Fabricius, John H., 3,588,641.
Fabricius, John H.; and Maher, John P., 3,588,642.
Hukee, Vernon V., 3,588,393.
Markarian, Mark, 3,588,627.
Millard, Richard J.; Larson, Warren A.; and Thompson, David G., 3,588,629.
Miller, David S.; Presia, Elmo James; and Cooper, Alan G., 3,588,630.
Miller, David S.; Fresia, Elmo James; and Cooper, Alan G., 3,588,631.
Palazzini, Norman S., 3,588,616.
Peck, David B., 3,588,628.
Ross, Sidney D.; and Frantz, Franklin D., 3,588,643.

Spyro Dynamics Corporation: *See—*
Gilbert, Jack J., 3,587,339.

Square D Company: *See—*
Eckl, James J.; and Griffin, James Thomas, 3,588,435.
Layton, Beryl W., 3,588,619.
Stanbach, Harris I., 3,588,413.

St. Paul Brass Foundry Company: *See—*
Phillips, Harold E., 3,587,865.

Stackpole Components Company: *See—*
Edwards, Joseph Arthur, Jr.; Bishop, Vernon; Geci, Melan; and Campbell, Dudley H., 3,588,778.

Stadelman, Frank, to Latendorf Convehing Corporation. Transfer apparatus. 3,587,891, Cl. 214-309.

Stadler Hurter International Ltd.: *See—*
Hurter, Alfred Max, 3,587,257.

Staffiere, Donald T.: *See—*
McCormack, Thomas L.; Morin, Maurice A.; and Staffiere, Donald T.,3,588,852.

Stafford Tool and Die Company Limited: *See—*
Prew, Thomas B., 3,587,372.

Staller, Karel J., to Flexigrip, Inc. Zipper tubing. 3,587,657, Cl. 138-156.

Stanbach, Harris I., to Square D Company. Terminal strap, contact jaw member, and connector assembly for electrical switch. 3,588,413, Cl. 200r166.

Standard Oil Company: *See—*
Ries, Herman E., Jr.; and Gabor, Joseph, 3,587,860.

Stanford Research Institute: *See—*
Rosen, Charles A., 3,588,486.

Stanley Works, The: *See—*
Burrows, Milford D.; and Quedens, Phillipp J., 3,587,387.

Stark, Robert J. Reels and reel-and-ribbon assemblies. 3,587,991, Cl. 242-55.16

Starnes, Billy Wayne: *See—*
Johnson, James Burl, Jr.; Hammond, Malcolm Perry; and Starnes, Billy Wayne,3,588,182.

Statni vyzkumny ustav kozedelny: *See—*
Plechac, Bohuslav; and Mudrik, Josef, 3,587,258.

Staudt, Heinrich: *See—*
Hofmann, Eberhard; Muller, Rolf; and Staudt, Heinrich,3,587,540.

Stearns, Charles F.: *See—*
Fisher, George A.; and Stearns, Charles F.,3,587,231.

Stehle, Max; and Kirchner, Egon, to Brown, Boveri & Cie Aktiengesellschaft. Method and apparatus for severing of metal band or metal plate. 3,587,953, Cl. 225-2.

Stehr, Eugen. Means for constructing buoyant platforms. 3,587,503, Cl. 114-0.5

Steiner, Ralph J.: *See—*
Meyer, John W.; and Steiner, Ralph J.,3,587,454.

Stelledar, Inc.: *See—*
Holt, Anatol W., 3,588,112.

Steller, Peter: *See—*
Mutke, Reinhold; and Steller, Peter,3,587,488.

Stern, Howard S.: *See—*
Reikes, Dan; Grimes, James G.; Hale, Carl R.; and Lott, Lewis E., 3,587,576.

Sternhoff, Bror Lennart Teodor: *See—*
Ljungberg, Sten Herman; and Sternhoff, Bror Lennart Teodor,3,588,054.

Stewart, David J.: *See—*
Kyte, Derek J.; and Stewart, David J.,3,588,506.

Stewart, Edward C.; and Walter, Florian A., to Lyon Metal Products, Incorporated. Suspension system for filing cabinet. 3,588,198, Cl. 308-3.8

Stewart, Edward J.: *See—*
Regnier, Clarence H.; Stewart, Edward J.; and Stewart, Peter E., 3,587,933.

Stewart, Edward J.: *See—*
Regnier, Clarence H.; Stewart, Edward J.; and Stewart, Peter E.,3,587,933.

Stewart, Mark C., 1/10 to Mellor, Wendell J., and 1/5 to Hild, Mark W., II. Amusement apparatus. 3,588,098, Cl. 272-1.

Stewart, Peter E.: *See—*
Regnier, Clarence H.; Stewart, Edward J.; and Stewart, Peter E., 3,587,933.

Stewart, Peter E.: *See—*
Regnier, Clarence H.; Stewart, Edward J.; and Stewart, Peter E.,3,587,933.

Stewart, Warren A.; and Bridges, Richard J., to Koppers Company, Inc. Pre-settable slitter-scorer apparatus. 3,587,374, Cl. 83-56.

Stewart-Warner Corporation: *See—*
Brouwer, Frans; and Sobchak, Frank L., 3,588,343.

Stier, Henry Willy: *See—*
Schnellman, Oscar; and Stier, Henry Willy,3,587,192.

Stiffler, Jack J.: *See—*
United States of America,National Aeronautics and Space Administration, Administrator, 3,588,883.

Stimamiglio, Alberto. Refrigerator cabinet. 3,588,214, Cl. 312-214.

Stimatze, Lawrence L. Power tilt for outboard motors. 3,587,513, Cl. 115-41.

Stobbe, Richard E.: *See—*
Lohneis, Earl R.; and Stobbe, Richard E.,3,587,390.

Stoffers, Raymond C.: *See—*
Olsen, Karl M.; and Stoffers, Raymond C.,3,588,764.

Stone Container Corporation: *See—*
Stone, Roger W.; and Rorer, Donald R., 3,587,200.

Stone, Eugene E., III; Lynch, Walter L., Jr.; and Barron, Roger D., to Stone Manufacturing Company. Apparatus and method for picking up and transporting cloth pieces from a stack. 3,588,091, Cl. 271-19.

Stone, Leslie F. Level control responsive apparatus. 3,588,521, Cl. 307-118.

Stone Manufacturing Company: *See—*
Stone, Eugene E., III; Lynch, Walter L., Jr.; and Barron, Roger D., 3,588,091.

Stone, Roger W.; and Rorer, Donald R., to Stone Container Corporation. Continuous skin-packaging machine and method. 3,587,200, Cl. 53-22.

Stott, Reginald W., to Beermaster Industries Ltd. Automatic shut-off valve and gas trap. 3,587,927, Cl. 222-66.

Strandberg, Lennart; and Strandberg, Maj, to Autolift Garage AB. Sectional component endless parking elevator. 3,587,878, Cl. 214-16.1

Strandberg, Maj: *See—*
Strandberg, Lennart; and Strandberg, Maj,3,587,878.

Strasser, Myron S.; and Strasser, Samuel A. Packaging insert for collars. 3,587,948, Cl. 223-84.

Strasser, Samuel A.: *See—*
Strasser, Myron S.; and Strasser, Samuel A.,3,587,948.

Strauch, Raymond, to U.S. Philips Corporation, mesne. Measuring device for example, frequency-modulation radio altimeter. 3,588,899, Cl. 343-14.

Strayer, John Joseph, to Johns-Manville Corporation. Pipe-insulation packaging system. 3,587,201, Cl. 53-24.

Streater Industries, Inc.: *See—*
Fenwick, Jay G., 3,587,867.

Stroman, Larry J., to Daniel Industries, Inc. Digital multiplying circuit. 3,588,481, Cl. 235-151.34

Strombeck, Per Albin: *See—*
Bohlin, Karl Gunnar; Gustafsson, Carl-Erik; Johnsson, Stig Arthur; and Strombeck, Per Albin,3,587,889.

Stromberg-Carlson Corporation: *See—*
Bartlett, William F.; Randmere, Uno; and Scott, Richard, 3,588,833.
Potter, Frank, 3,588,368.

Stubbs, Allan H. Prestressing apparatus. 3,588,045, Cl. 254-29.

Studebaker, Robert H. Laser beam survey apparatus. 3,588,249, Cl. 356-4.

Studer, Henry E.; and Olmo, Harold P., to University of California, The Regents of the. Machine for depositing grapes. 3,587,931, Cl. 222-176.

Sturges, Hiram A.: *See—*
Wienert, Lloyd C.; Fitzgerald, Lynn; Sturges, Hiram A.; and Johnson, Henry T.,3,587,529.

Sturlason, Leif V.; and Sjotun, Kyrre G., to Danfoss A/S. Motor with pump and blower for oil burners. 3,588,284, Cl. 417-201.

Sturm, Edward Louis, to Eastman Kodak Company. Firing mechanism for percussively ignitable flashlamps. 3,588,300, Cl. 431-93.

Sub-Atlas-Werke GmbH: *See—*
Jeske, Carl-Heinz; and Johnston, William E., 3,588,376.

Subik, Vincent P.: *See—*
Brearley, Lawrence E.; Jensen, Stanley M.; Subik, Vincent P.; and Williams, Gordon L.,3,588,615.

Sud-Aviation Societe Nationale de Constructions: *See—*
Miniovitch, Wladimir; and Chenin, Claude, 3,587,999.

Suddeutsche Mechanische Werkstatten Wolf FRHR Von Hornstein Komimanditgesselschaft: *See—*
Richt, Hubert, 3,587,180.

Sugiura, Hiroshi; Tsuge, Sakae; Hosaka, Izumi; Kusunoki, Kunio; and Fujita, Saburo, to Toyota Jidosha Kogyo Kabushiki Kaisha, and Aisin Seiki Kabushiki Kaisha. Clutch disc with wavy surfaces. 3,587,803, Cl. 192-107.

Sulich, Janusz S., to Bendix Corporation, The. Fluidic fuel injection with bistable valve. 3,587,543, Cl. 123-119.

Sullivan, Clifford J. Wire guide for terminal attaching machines. 3,587,158, Cl. 29-203.

Sumins, Edmund Joseph: *See—*
Gadd, John Horace; Hadekel, Ruben; and Sumins, Edmund Joseph,3,587,396.

Sun Electric Corporation: *See—*
Halinski, Michael J.; and Wanschek, Larry, 3,588,608.

Sun Oil Company: *See—*
Young, Einar T., 3,587,337.
Young, Einar T., 3,587,633.

Sundstrand Corporation: *See—*
Perriman, Harold R., 3,587,780.

Sunstrand Corporation: *See—*
Moon, Harry C., Jr., 3,588,285.

Superior Valve Company: *See—*
Yocum, William C., 3,587,654.

Susor, William C., to Reliance Electric and Engineering Company, The, mesne. Electronic computing weighing scale with price per multiple pounds input. 3,587,759, Cl. 177-4.

Suter, Xaver; Schubert, Dale W.; and Ezekiel, Frederick D., to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG Wright, Barry, Corporation. Missile with brake flaps Active fluid isolation system. 3,588,004, Cl. 244-17.27

Sutherland, James F.: *See—*
Willard, Frank G.; and Sutherland, James F.,3,588,665.

Sutherland, William V.: *See—*
Wolf, Jeremiah P.; Sutherland, William V.; and Dusa, Donald J.,3,587,973.

Sutton, Henry C., Jr.: *See—*
Keller, Robert A.; Mc Gough, Wayne L.; and Sutton, Henry C., Jr.,3,587,243.

Sutton, Robert W., to Bendix Corporation, The. Carburetor priming system. 3,587,553, Cl. 123-180.

Suzuki, Shiro, to Meidensha Electric Mfg. Co., Ltd. Voltage regulator circuit effective over predetermined input range. 3,588,675, Cl. 323-22.

Svenska Cellulosa Aktiebolaget: *See—*
Bohlin, Karl Gunnar; Gustafsson, Carl-Erik; Johnsson, Stig Arthur; and Strombeck, Per Albin, 3,587,889.

Svenska Industrietableringsaktiebolaget: *See—*
Nystrom, Kjell Signar, 3,587,151.

Swank, Inc.: *See—*
Kaye, Ronald H., 3,587,262.

Swanson, Hilmer I., to Gates Radio Company. Amplitude compensated pulse duration modulator. 3,588,744, Cl. 332-9.

Sweetland, David John: *See—*
Scott-Scott, John Lanfear; and Sweetland, David John,3,588,266.

Swengel, Robert Charles, Jr.: *See—*
Kunkle, John Philip; and Swengel, Robert Charles, Jr.,3,588,784.
Switchcraft, Inc.: *See—*
Conrad, Richard A., 3,588,420.
Sybron Corporation: *See—*
Lauterbach, Norman E., 3,588,488.
Sycor Inc.: *See—*
Wood, Robert E., 3,587,997.
Sylvania Electric Products Inc.: *See—*
Hirshfield, Edward, 3,588,752.
Siwko, Karol; and Thomas, Joseph Edward, 3,588,327.
Turner, Elbert L.; Rapoza, James P.; and Jackman, Clude A., 3,588,716.
Vetere, John J., 3,588,564.
Symons Mfg. Company: *See—*
Bowden, George F., 3,588,027.
Systems Design Company, Inc.: *See—*
Sorenson, Gerald T., 3,587,156.
Szekely, Laszlo; Pigache, Claude; and Lafaye, Michel, to Engins Matra. Dual speed clutches with brake. 3,587,797, Cl. 192-18.
Szilagyi, Bela: *See—*
Price, Howard; and Szilagyi, Bela,3,587,592.
Ta-Chuan Wu, Rodney, to Texas-U.S. Chemical Company. Apparatus and method for testing elastomeric compositions for their crack resistance. 3,587,302, Cl. 73-100.
Tada, Yasuo: *See—*
Nomura, Takuya; and Tada, Yasuo,3,588,840.
Taesler, Rudolf: *See—*
Hochstein, Roland; Borner, Gerhard; and Taesler, Rudolf,3,588,239.
Tahara, Takashi: *See—*
Isogai, Tokio; Tahara, Takashi; and Inoue, Toshio,3,588,319.
Tait, Raymond Carl, to Hunter Manufacturing Company. Telescopic load booster. 3,587,784, Cl. 187-9.
Tajiri, Akira. Two-piece key. 3,587,260, Cl. 70-395.
Takagi, Yoshinori: *See—*
Sakai, Yasuhide; Takagi, Yoshinori; and Atanabe, Masahiro,3,588,706.
Takahashi, Koichi; and Hitomi, Nobuteru, to Nissan Motor Company, Limited. Automotive differential mechanism of limited-slip type. 3,587,346, Cl. 74-710.5
Takenaka, Hiroshi: *See—*
Yamamoto, Tadaaki; and Takenaka, Hiroshi,3,588,227.
Takimoto, Tetsuro, to Victor Company of Japan, Limited. Indication device for sound producing equipment. 3,588,780, Cl. 335-196.
Tamny, Simon; and Tyler, James B., to Wayne Manufacturing Company. Street sweeper filter cleaning system. 3,587,213, Cl. 55-300.
Tamura Electric Works Limited: *See—*
Nakanishi, Tsunemoto, 3,588,474.
Tanaka, Minoru: *See—*
Nakayama, Norihiko; Tanaka, Minoru; and Miyauchi, Eizo,3,588,600.
Tanaka, Tameo, to Kyokuto Giken Co., Ltd. Automatic cock device. 3,588,038, Cl. 251-129.
Tanaka, Tamotsu; and Hara, Syozi, to Matsushita Electric Industrial Co., Ltd. Device for simultaneously separating and feeding three or four gib-headed rods. 3,587,923, Cl. 221-224.
Taniguchi, Koichi: *See—*
Nakano, Yoshiaki; Okamoto, Atutosi; Taniguchi, Koichi; and Toyama, Koichi,3,588,190.
Taniya, Takaaki: *See—*
Shiki, Haruo; and Taniya, Takaaki,3,588,700.
Tankus, Harry: *See—*
McKillop, George R.; Tankus, Harry; and Thayer, James H.,3,588,126.
Taquino, Thomas P.: *See—*
Hieber, Ellsworth E.; Taquino, Thomas P.; and Hillery, Frank Edward,3,587,678.
Taschler, Edward J.: *See—*
Appel, Arthur; and Taschler, Edward J.,3,588,430.
Tatoian, George, to Cardiac Electronics, Inc. Disposable electrode. 3,587,565, Cl. 128-2.06
Tatsumi, Ryuji: *See—*
Yoshikawa, Shogo; and Tatsumi, Ryuji,3,588,739.
Taube, Robert Otto: *See—*
Cantral, John Isaac; and Taube, Robert Otto,3,587,750.
Taylor, Monroe F., to Grace, W. R., & Co. Apparatus for controlling the tracking of continuous sheets of film. 3,587,958, Cl. 226-17.
Taylor, Oliver E.; and Wildenberg, Arthur A. Glass bottle shattering and grinding apparatus. 3,587,984, Cl. 241-99.
Tech, Donald D., to International Business Machines Corporation. Two-color matrix-type display panel. 3,588,596, Cl. 315-169.
Technicon Corporation: *See—*
Isreeli, Jack; and Kassel, Aaron, 3,588,281.
Technidyme, Inc.: *See—*
Alexander, John, 3,588,255.
Tek Bearing Company: *See—*
Kane, Thomas E., 3,588,208.
Tektronix, Inc.: *See—*
Wilson, George R., 3,588,672.
Teledyne, Inc.: *See—*
Hays, Robert F., Jr., 3,587,311.
Telefonaktiebolaget L M Ericsson: *See—*
Fjallbrant, Tore Torstensson; and Hagerlof, Bernt Ingvar, 3,588,743.
Telefunken Patentverwertungsgesellschaft m.b.H.: *See—*
Bruch, Walter, 3,588,321.
Telephone Manufacturing Company Limited: *See—*
Williams, Ioan Hugh, 3,588,548.
Teleprompter Corporation: *See—*
Schlafly, Hubert J., Jr., 3,588,866.
Telesco Brophey Limited: *See—*
Bremshey, Fritz; and Seitel, Heinz, 3,587,600.
Teletype Corporation: *See—*
Cook, Harold D., 3,588,697.
Kahanic, Francis P., 3,588,344.
Ramig, Robert J., Jr., 3,588,346.
Temme, Helmut, to Gewerkachaft Eisenhutte Westfalia. Scraper-flight conveyor. 3,587,831, Cl. 198-171.
Tennant, David A.: *See—*
Folson, Theodore R.; Weitz, William E., Jr.; and Tennant, David A.,3,588,257.
Terman, Lewis M.: *See—*
Duda, William L.; and Terman, Lewis M.,3,588,830.
Terman, Lewis M., to International Business Machines Corporation. For phase diode-FET shift register. 3,588,528, Cl. 307-221.
Tesla, narodni podnik: *See—*
Jagos, Frantisek, 3,587,988.
Tetra Tech, Inc.: *See—*
Rossfelder, Andre M.; and Thorn, Bertram J., 3,588,174.
Teves, Alfred Maschinen- und Armaturenfabrik KG: *See—*
Klein, Hans Christof; Beller, Hans; and Schrader, Gert, 3,588,810.
Texaco Inc.: *See—*
Armistead, Fontaine C., 3,587,175.
Armistead, Fontaine C.; and Paull, Peter L., 3,588,796.
Texas-U.S. Chemical Company: *See—*
Beauchamp, George D.; and Ware, James M., 3,587,290.
Ta-Chuan Wu, Rodney, 3,587,302.
Texas Instruments, Incorporated: *See—*
Alexander, Earl Glynn; and Runyan, Walter Richard, 3,587,166.
Schroen, Walter H., 3,588,777.
Slugantz, Thomas E., 3,588,603.
Textron Inc.: *See—*
Potter, Howell L., 3,587,154.
Rieth, Kurt A., 3,587,226.
Thayer, James H.: *See—*
McKillop, George R.; Tankus, Harry; and Thayer, James H.,3,588,126.
Theobald, Reiner; and Luc-Belmont, Stephane, to Vereingte Deutsche Metallwerke AG, and Compagnie de Saint Gobain. Bottle carrier of plastics material. 3,587,915, Cl. 220-102.
Theuerer, Henry C.; and Turner, Paul A., to Bell Telephone Laboratories, Incorporated. Magnetic wire. 3,588,853, Cl. 340-174.
Theys, Ezra E.; and Morse, Hugh B., to Fibreboard Corporation. Apparatus and method for closing and sealing cartons. 3,587,411, Cl. 93-36.3
Thibeau, Jacques, to Societe anonyme dite: A. Thibeau & Cie. Treatment of fibrous textile materials. 3,587,139, Cl. 19-66.
Thomas & Betts Corporation, The: *See—*
O'Loughlin, Francis A., 3,588,788.
Thomas, Eugene P., to Westinghouse Electric Corporation. Inflatable mattress apparatus. 3,587,568, Cl. 128-33.
Thomas, Glenn R.: *See—*
Ellsworth, James P.; and Thomas, Glenn R.,3,588,772.
Thomas, Joseph Edward: *See—*
Siwko, Karol; and Thomas, Joseph Edward,3,588,327.
Thomas, Raymond J.; Mc Donald, William G.; and Dunning, Walter B., to Eastman Kodak Company. Cardboard box and method of making same. 3,587,412, Cl. 93-39.
Thomasson, Gene I.: *See—*
Levand, Victor A., Jr.; Thomasson, Gene I.; and Holcomb, Richard H.,3,588,315.
Thompson, David G.: *See—*
Millard, Richard J.; Larson, Warren A.; and Thompson, David G.,3,588,629.
Thompson, John E.: *See—*
Lambden, Joseph F.; and Thompson, John E.,3,588,611.
Thompson, Sheldon. Methods and apparatus for manipulating submerged or unsubmerged objects. 3,587,506, Cl. 114-51.
Thompson, Taylor N.: *See—*
Bender, Charles E.; Thompson, Taylor N.; and Fraser, Douglas,3,587,899.
Thompson, Woodrow F. Trailer hitch. 3,588,145, Cl. 280-406.
Thomson, David J., to Bell Telephone Laboratories, Incorporated. Electrically responsive fluid logic device. 3,587,615, Cl. 137-81.5
Thomson Industries, Inc.: *See—*
Thomson, John B., 3,588,200.
Thomson, John B., to Thomson Industries, Inc. Self alining mount for linear motion ball bearings. 3,588,200, Cl. 308-6.
Thomson, Kenneth: *See—*
Luke, Robert R.; Robinson, Marshall M.; and Thomson, Kenneth,3,588,911.
Thomson-CSF: *See—*
Ciecierski, Jean, 3,588,583.
Thonigs, Rolf: *See—*
Schluter, Wilhelm; and Thonigs, Rolf,3,587,402.

Thorn Automation Limited: *See—*
Boughton, Gordon Rex, 3,588,724.
Thorn, Bertram J.: *See—*
Rossfelder, Andre M.; and Thorn, Bertram J.,3,588,174.
Thorn Electrical Industries Limited: *See—*
Isaacs, Anthony L., 3,588,598.
Thorpe, Laurence Joseph: *See—*
Dischert, Robert A.; and Thorpe, Laurence Joseph,3,588,338.
Thorson, Sheldon E.: *See—*
Klein, Richard G.; Thorson, Sheldon E.; and Morris, John C.,3,587,453.
Thrasher, Kenneth E.: *See—*
Courtney, John G.; Chancellor, Miles F.; Chancellor, Paul R.; and Thrasher, Kenneth E.,3,587,597.
Thumim, Carl, to North American Rockwell Corporation, mesne. Systems for marking a magnetic tape with a repetitive pattern. 3,587,375, Cl. 83-71.
Thyssens, Guido Maria Josepha Benedikt, to International Standard Electric Corporation. AC signal transmission system. 3,588,373, Cl. 179-84.
Tibbetts, Raymond E.: *See—*
Wilczynski, Janusz S.; and Tibbetts, Raymond E.,3,588,228.
Tiggesbaumker, Peter: *See—*
Henne, Heinrich; and Tiggesbaumker, Peter,3,587,980.
Tilly, Ralph R.: *See—*
Harris, Halbert M.; Headd, Franklin L.; Huber, Charles L.; Rugaber, Robert H.; and Tilly, Ralph R.,3,588,335.
Timby, Ronald L., to Machinery Automation Research Corporation. Sewing devices. 3,587,496, Cl. 112-217.
Timex Corporation: *See—*
Zatsky, Norman Charles, 3,587,223.
Tindall, David; and Needham, Arthur Michael, to J & T Engineers (ascot) Limited. Fluid injectors. 3,587,970, Cl. 239-126.
Tisi, Felix D.; and Leuthold, Peter, to U.S. Philips Corporation, mesne. Transmitter for single sideband transmission bivalent of pulses. 3,588,702, Cl. 325-38.
Toby, Edward P., to Toby Enterprises. Demand slicer. 3,587,688, Cl. 146-94.
Toby Enterprises: *See—*
Toby, Edward P., 3,587,688.
Todd, John M. Cartesian diving toy. 3,588,099, Cl. 272-8.
Tokumitsu, Ichiro; Okamura, Mitsumaro; and Asano, Souji, to Idemitsu Petrochemical Co., Ltd. Supporting element for mounting heat exchanger for quenching thermally cracked gas. 3,587,727, Cl. 165-68.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Kihara, Yasukane; Moriyama, Ushimatsu; and Seta, Yoichi, 3,588,625.
Okamoto, Harumichi; Shikata, Toshio; and Magaribuchi, Kazuo, 3,588,028.
Tollefson, Robert D., to Collins Radio Company. Frequency synthesizer. 3,588,732, Cl. 331-2.
Tomasi, Biagio J.: *See—*
Potter, Olin E.; and Tomasi, Biagio J.,3,588,288.
Tomik, George A. Dispenser mechanism. 3,587,478, Cl. 107-8.
Tong, Shih Y., to Bell Telephone Laboratories, Incorporated. Double-character erasure correcting system. 3,588,819, Cl. 340-146.1
Toronto Coppersmithing Company Limited: *See—*
Scholtz, Myndert T., 3,588,052.
Torrest, Robert S.: *See—*
Wittenwyler, Clifford V.; and Torrest, Robert S.,3,587,742.
Tosch, William C., to Marathon Oil Company. Prevention of salt water encroachment into fresh water aquifers. 3,587,737, Cl. 166-252.
Townsend, Nicholas A.; and Oxlade, Roy R., to British Iron and Steel Research Association, The. Stock tension control in rolling mills. 3,587,267, Cl. 72-21.
Toyama, Koichi: *See—*
Nakano, Yoshiaki; Okamoto, Atutosi; Taniguchi, Koichi; and Toyama, Koichi,3,588,190.
Toyama, Yoji; and Hirose, Yutaka, to Toyo Kogyo Co., Ltd. Center housing for a rotary piston engine. 3,588,296, Cl. 418-83.
Toyo Kogyo Co., Ltd.: *See—*
Toyama, Yoji; and Hirose, Yutaka, 3,588,296.
Toyo Kohan Co., Ltd.: *See—*
Miyamatsu, Yasunori; Hashimoto, Yuji; and Enari, Shoji, 3,587,598.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Sugiura, Hiroshi; Tsuge, Sakae; Hosaka, Izumi; Kusunoki, Kunio; and Fujita, Saburo, 3,587,803.
Tracor, Inc.: *See—*
Rudmose, H Wayne; and Estes, Nelson N., 3,588,358.
Tradler, Marvin M., to Wheeling-Pittsburgh Steel Corporation. Apparatus for coiling metal bands. 3,587,993, Cl. 242-80.
Travin, Petr Ivanovich: *See—*
Abashkin, Valentin Vasilievich; and Travin, Petr Ivanovich,3,588,204.
Tri W-G, Inc.: *See—*
Wieland, Roman G., 3,587,482.
Tri-State Oil Tool Industries, Inc.: *See—*
Kerr, William I., 3,587,748.
Trico Products Corporation: *See—*
Gadd, John Horace; Hadekel, Ruben; and Sumins, Edmund Joseph, 3,587,396.
Trident Engineering Associates, Inc.: *See—*
Jasperson, Robert E., 3,587,309.
Triebold, Karl-Friedrich: *See—*
Ziehm, Gunter Hans; and Triebold, Karl-Friedrich,3,588,797.
Triglia, Benito. Cup dispensing liquid container. 3,587,917, Cl. 221-96.
Tritton Enterprises Ltd.: *See—*
Tritton, Victor R.; and Painaud, Jean, 3,588,157.
Tritton, Victor R.; and Painaud, Jean, to Tritton Enterprises Ltd. Tamper indicating seals. 3,588,157, Cl. 292-322.
Troxel Manufacturing Company: *See—*
Rich, Maurice E., Jr., 3,588,171.
Truckenmiller, Major C.: *See—*
Fites, Larry L.; and Truckenmiller, Major C.,3,587,517.
Trump, John G. Low dose rate high output electron beam tube. 3,588,565, Cl. 313-74.
TRW Inc.: *See—*
Atkin, Rupert L.; and Drutchas, Gilbert H., 3,588,191.
Drutchas, Gilbert H.; Clark, Hubert M.; and Campbell, David D., 3,588,192.
Drutchas, Gilbert H., 3,588,193.
Goff, Raymon L.; and Gagen, Charles V., 3,587,235.
Sorkin, Morris; and Lindstrom, Gary, 3,588,703.
Tschopp, Werner; and Keller, Toni, to Spectrospin AG. Signal generator for a nuclear resonance spectrograph. 3,588,676, Cl. 324-0.5
Tsuge, Sakae: *See—*
Sugiura, Hiroshi; Tsuge, Sakae; Hosaka, Izumi; Kusunoki, Kunio; and Fujita, Saburo,3,587,803.
Tsugihashi, Hajime: *See—*
Hatsukano, Yoshikazu; and Tsugihashi, Hajime,3,588,525.
Tsuruya, Yoshimasa: *See—*
Okuda, Bunichi; Nobata, Akio; Ogawa, Noboru; Okabe, Isamu; Tsuruya, Yoshimasa; and Oosuga, Michitaka,3,587,907.
Tubinis, Matthew P., to Xerox Corporation. Apparatus for positioning a light spot onto a character mask. 3,588,584, Cl. 315-10.
Tucker, James W.; and Cosden, Thomas H., to United States of America, Navy. Water wave monitor. 3,587,308, Cl. 73-170.
Tudor, Sidney; and Mironov, Jack, to United States of America, Navy. Vacuum coating apparatus. 3,587,523, Cl. 118-50.1
Turbo Refrigerating Company: *See—*
Hagen, William F., 3,587,241.
Turek, Robert F.: *See—*
Moore, Larry R.; and Turek, Robert F.,3,587,604.
Turnbull Marine Design Company Limited: *See—*
Clay, John A., 3,587,509.
Turner, Elbert L.; Rapoza, James P.; and Jackman, Clude A., to Sylvania Electric Products, Inc. Method and apparatus for detecting when the spectrum of a pulse signal is centered in the pass- band of a receiver. 3,588,716, Cl. 328-167.
Turner, John W., Jr.: *See—*
Jones, Taylor L.; and Turner, John W., Jr.,3,588,162.
Turner, Paul A.: *See—*
Theuerer, Henry C.; and Turner, Paul A.,3,588,853.
Twenty-First Century Corporation: *See—*
Koeppe, Douglas F., 3,588,006.
Tyler, James B.: *See—*
Tamny, Simon; and Tyler, James B.,3,587,213.
Uberbacher, Edward C.: *See—*
Beausoleil, William F.; and Uberbacher, Edward C.,3,588,408.
Hardardt, Alfred T.; and Uberbacher, Edward C.,3,588,785.
Ueda, Kazunori: *See—*
Osawa, Hiroji; Ishii, Kazuzo; Fujimura, Yasushi; Nakamura, Yosiro; Ueda, Kazunori; Imai, Toshio; Araki, Sigeru; Okubo, Kei; and Kubota, Tadashi,3,588,243.
Uemura, Saburo; and Yanagisawa, Yuzuru, to Sony Corporation. Gaseous glow indicator tube formed on a substrate with a plurality of insulating layers. 3,588,571, Cl. 313-109.5
Uhlmann, Ernest A.: *See—*
Elmore, Austin E.; and Uhlmann, Ernest A.,3,587,934.
Uitto, Gary E.: *See—*
Benke, Frank W.; and Uitto, Gary E.,3,587,169.
Ulmer, Wolfgang, to Siemens Aktiengesellschaft. Quartz-controlled transistor oscillator. 3,588,750, Cl. 332-302.
Umanos, Romeo O., to General Motors Corporation. Cable coupling. 3,587,248, Cl. 64-4.
Umeda, Kaoru: *See—*
Kuramoto, Yoshio; and Umeda, Kaoru,3,587,998.
U. M. Electrical Distributors Limited: *See—*
Haigh, Richard Woolliscroft; and Commander, Frederick Vincent, 3,587,950.
Unarco Industries, Inc.: *See—*
Enochian, Samuel H., 3,587,480.
Undergarment Assemblies, Inc.: *See—*
Block, Charles; and Mintz, Leon J., 3,587,947.
Underwater Storage, Inc.: *See—*
Quase, Harold G., 3,587,116.
Unger, Peter I.; and Bright, Edward D., to Fairbanks Morse Inc. Processing control system. 3,588,480, Cl. 235-151.3
Union Carbide Corporation: *See—*
Milton, Robert M., 3,587,730.
Saenger, John F., Jr.; Enis, Allan; and McGinty, Harry C., 3,588,464.
Usen, Norman; and Krachy, Charles Edward, 3,587,929.
Union Tank Car Company: *See—*
Yopp, John L., 3,588,042.
Unit Process Assemblies, Inc.: *See—*
Weinstock, Jacques J.; and Hay, William D., 3,588,507.

United Aircraft Corporation: *See—*
Best, Stanley G., 3,588,463.
Fisher, George A.; and Stearns, Charles F., 3,587,231.
Grafton, Donald L.; and Gifford, George M., 3,588,523.
United Gas Industries Limited: *See—*
Burrett, Kenneth Frederick, 3,587,315.
United Kingdom Atomic Energy Authority: *See—*
Laundy, Brian John Russell; and Hardwick, William Horton, 3,588,504.
United Kingdom of Great Britain and Northern Ireland, Minister of Technology in Her Britannic Majesty's Government of the: *See—*
Bryce, William Dean, 3,587,232.
United McGill Corporation: *See—*
Horton, Richard W., 3,587,163.
United State Steel Corporation: *See—*
Lanatti, Joseph H.; and Shapland, James T., 3,587,945.
United States Envelope Company: *See—*
Rappaport, Maximiliano, 3,587,414.
United States of America
Agriculture: *See—*
Reznik, David, 3,587,857.
Air Force: *See—*
Goggins, William B., Jr.; and Poirier, Joseph L., 3,588,895.
Army: *See—*
Bell, William E., 3,588,740.
Black, Walter L.; and Holford, Frank L., 3,588,050.
Bognar, Frank J.; and Gavagan, Robert J., 3,588,156.
Cohen, Marvin M.; Penar, James D.; and Kurtz, David W., 3,588,634.
Griswold, Earl N., 3,588,043.
Johnston, James V., 3,588,003.
Kohler, Hans W., 3,588,687.
Picillo, Vincent M., 3,588,538.
Ragsdale, Charles W., 3,587,563.
Van Beek, Herman W., 3,588,848.
Wittmann, Horst R., 3,588,253.
Atomic Energy Commission: *See—*
Chau, Henry H. M., 3,587,301.
Clay, Haile S., 3,587,632.
Duncan, Richard D., 3,587,333.
Johnson, Ralph T., Jr., 3,588,505.
Koski, Oscar H., 3,588,692.
Mark, John W.; and Barney, Howard H., 3,587,613.
Rabinowitz, Mario; and Garwin, Edward L., 3,588,593.
Satterfield, Marion M., 3,588,729.
National Aeronautics and Space Administration, Administrator, with respect to an invention of:
UNITED STA. D. C. servo system including an A. C. motor. 3,588,648, Cl. 318-227.
Anderson, Tage O., and Stiffler, Jack J. Encoder/decoder system for a rapidly synchronizable binary code. 3,588,883, Cl. 340-347.
Kolbly, Richard B. High power microwave power divider. 3,588,751, Cl. 333-6.
Loch, Frank J., and Conrad, William M. Frequency-modulation demodulator threshold extension device. 3,588,705, Cl. 325-348.
Olsasky, Mark J. Laser camera and diffusion filter therefor. 3,587,424, Cl. 95-11.
National Aeronautics and Space Administration: *See—*
Cribb, Herbert E., 3,588,359.
Deboo, Gordon J.; and Hedlund, Roger C., 3,588,671.
Hilborn, Edwin H.; and Bullinger, Hans B., 3,588,874.
Lesniewski, Robert J., 3,588,483.
Vermillion, Charles H., 3,588,331.
Navy: *See—*
Aldrich, John A., 3,588,237.
Beagles, John A.; and Armstrong, William H., 3,587,779.
Blazek, Donald F.; Bury, Elmer J.; Moore, Robert W.; and Smith, Oliver J., 3,587,419.
Bliss, Billy R., 3,587,468.
Brown, Daniel N., 3,587,310.
Buebel, Edgar W., Jr.; and King, Ronald J., 3,588,662.
Butler, William F., 3,588,723.
Couch, Dean H.; and Burdette, George W., 3,587,321.
Crookshanks, Rex J.; and Roberts, Don G., 3,588,733.
Daugherty, Thomas L.; and Philips, Gerald J., 3,588,205.
De Rieux, Thomas H., 3,588,230.
Duarte, Robert T., 3,588,896.
Fluhr, Ferderick R., 3,588,720.
Folson, Theodore R.; Weitz, William E., Jr.; and Tennant, David A., 3,588,257.
Gersman, Jerome, 3,588,025.
Gratton, Peter D.; and Ayres, James N., 3,587,469.
Griffin, Hugh Allen, 3,588,690.
Gross, Kenneth W., 3,588,799.
Halley, Robert; Bolam, Robert J.; and Marshall, Carroll W., 3,588,693.
Jordan, Robert J., 3,588,497.
Kammer, Erwin W., 3,587,297.
Kearney, Stuart D., II, 3,587,504.
Kee, Robert, 3,588,452.
Konrad, Thomas G., 3,588,897.
Landy, Arney, Jr., 3,588,887.
Moshier, Stephen; and Batteau, Dwight W., 3,588,356.
Mostel, Joseph, 3,588,232.
Papineau, Milton D., 3,588,798.
Prickett, Michael J., 3,588,894.
Roylance, Byron D., 3,588,756.
Sayre, Jack L.; and Pace, Robert E., 3,588,161.
Scott, John E., 3,588,475.
Tucker, James W.; and Cosden, Thomas H., 3,587,308.
Tudor, Sidney; and Mironov, Jack, 3,587,523.
Viosca, Harry L., Jr., 3,588,399.
United States Steel Corporation: *See—*
Bowers, Glenn E.; and Edwards, Richard E., Jr., 3,587,293.
Dykeman, George, 3,588,536.
Lyman, Richard E., 3,588,069.
Ollis, George E., 3,588,318.
Pysnik, Joseph, 3,588,699.
United-Carr Incorporated: *See—*
Leathem, Douglas B.; Jones, Raymond A.; and Pope, Walter F., 3,588,612.
McKee, William H., 3,588,782.
Universal Oil Products Company: *See—*
Hensel, Walter C., 3,587,198.
McGregor, Eugene R., 3,588,172.
University of California, The Regents of the: *See—*
Studer, Henry E.; and Olmo, Harold P., 3,587,931.
University of Tennessee Research Corporation, The: *See—*
Shofner, Fred M., 3,588,656.
Uno, Yoshihiro, to Matsushita Electric Industrial Co., Ltd. Cathode ray tube. 3,588,587, Cl. 315-21.
Unterstenhoefer, Leo; and Krieger, Wilhelm, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Process for the size reduction of expanded plastics. 3,587,981, Cl. 241-29.
Uozumi, Tadashi, to Fujitsu Limited. Two level weak signal detecting circuit. 3,588,712, Cl.
Upjohn Company, The: *See—*
Fites, Larry L.; and Truckenmiller, Major C., 3,587,517.
Urbanosky, Thomas F., to General Electric Company. Flueric lag-lead circuit. 3,587,602, Cl. 137-81.5
U.S. Industries, Inc.: *See—*
Carrieri, Louis F.; and Spanke, Edwin A., 3,587,135.
U.S. Philips Corporation: *See—*
Baider, Jan Jacob; Rijinders, Johannes; and Van Leeuwen, Johannes Aloysius, 3,587,417.
Dubravec, Vladimir; and Hirsch, Kurt, 3,588,582.
Lagemann, Klaus, 3,588,546.
Marie, Jerard, 3,588,324.
Meyer, Dietrich, 3,588,473.
Meyer, Herbert, 3,588,749.
Rognon, Marcel, 3,588,585.
Schmidt, Wolfgang, 3,588,563.
Strauch, Raymond, 3,588,899.
Tisi, Felix D.; and Leuthold, Peter, 3,588,702.
Van Hensbergen, Gerrit Hendrik, 3,588,374.
Van Roessel, Frederik Johannes; and Hofman, Jan August Marcel, 3,588,827.
Verhoeven, Leonardus Adrianus Johannes; and Dollekamp, Hendrikus, 3,588,328.
Vonk, Marinus Arnoldus, 3,588,589.
Usen, Norman; and Krachy, Charles Edward, to Union Carbide Corporation. Multiple element aerosol dispenser. 3,587,929, Cl. 222-129.
USM Corporation: *See—*
Hold, Peter, 3,587,152.
Utterback, Max G., to General Dynamics Corporation. Hydroacoustic drive mechanism having a flexural seal. 3,587,519, Cl. 116-137.
Uyzkummy Ustav Bavlmarsky: *See—*
Ripka, Josef; Junek, Jan; Marsalek, Milan; and Hortlik, Frantisek, 3,587,219.
V-M Corporation: *See—*
Freier, Gerald H.; and Zanders, Charles E., 3,588,121.
Vabo, Bent Bors; and Andersen, Per Heymann, to Haldor F. A. Topsoe. Process for providing reactors with catalysts and vibrator for use in carrying out the process. 3,587,669, Cl. 141-12.
Vacca, Michelangelo, to Societa Metallurgica Italiana. Automatic machine for preparing the ends of metal pipes for the drawing operation. 3,587,287, Cl. 72-402.
Vaccaro, Angelo, to Columbia Controls Research Corporation. Chosen selection transmittal system. 3,588,826, Cl. 340-166.
Vaccaro, Angelo; and Dixon, Harold F. E., to Columbia Controls Research Corporation. Facsimile apparatus with vibrating pressure stylus and method thereof. 3,588,332, Cl. 178-6.6
Valbjorn, Knud Vagn: *See—*
Mahncke, Heinz; and Valbjorn, Knud Vagn, 3,587,343.
Valbonesi, Giuseppe: *See—*
Formenti, Ferdinando; and Valbonesi, Giuseppe, 3,588,366.
Valyi, Emery I. Apparatus for pressurizing hollow articles during molding. 3,587,133, Cl. 18-5.
Van Beek, Herman W., to United States of America, Army. Input-output-control circuit for memory circuit. 3,588,848, Cl. 340-173.
Van Brimer, Russell H.; and Culp, Fred E., to Mead Corporation, The. Image construction system with clocked information input. 3,588,906, Cl. 346-1.
Van De Sande, Nicholas. Holder for fish hooks and other small components. 3,588,078, Cl. 269-6.

Van Der Sluys, Peter C.; Ellis, George E.; Levine, Louis; and Modrow, Fred P., to Bendix Corporation, The. Servo system having a monitor and trip level test means. 3,588,658, Cl. 318-563.

van der Toorn, Adrianus Johannes: *See—*
Bijleveld, Willem Jan; and van der Toorn, Adrianus Johannes,3,588,457.

Vanderhelst, Peter W., to Robotron Corporation. Electrical circuit. 3,588,438, Cl. 219-117.

Vanderlaan, Robert D.: *See—*
Meulendyk, John W.; and Vanderlaan, Robert D.,3,587,963.

Van Hensbergen, Gerrit Hendrik, to U.S. Philips Corporation. Receiver for signalling signals of a frequency lying in the speechfrequency band. 3,588,374, Cl. 179-84.

Van Hulsel, Leonardus Marinus. Bottle or like pourers. 3,587,943, Cl. 222-455.

Van Leeuwen, Johannes Aloysius: *See—*
Balder, Jan Jacob; Rijinders, Johannes; and Van Leeuwen, Johannes Aloysius,3,587,417.

van Luyk, Johannes G. M. C. H.; and Huskes, Herman, to Koninklijke Nedelandse Textiel-Unie N.V. Method and device for assembling warps for fabrics. 3,587,146, Cl. 28-22.

Van Mullekom, Hubert Peter, to N.V. Machinefabriek L. Te Strake. Device for preparing a weft. 3,587,664, Cl. 139-122.

Van Roessel, Frederik Johannes; and Hofman, Jan August Marcel, to U.S. Philips Corporation, mesne. Variable linear matrix. 3,588,827, Cl. 340-166.

Varaut, Bernard, to Compagnie Des Compteurs. Automatic advance electronic ignition device for internal combustion engines. 3,587,552, Cl. 123-148.

Varga, Georg, to Osterreichische Mineralolverwaltung Aktiengesellschaft. Fishing device for deep wells. 3,588,165, Cl. 294-86.3

Vargo, Donald P.: *See—*
Gessner, Gunter J.; and Vargo, Donald P.,3,588,857.

Varian Associates: *See—*
Ernst, Richard R., 3,588,678.
Mc Bride, Richard A.; Herbert, Reginald S.; and Weintraub, Warren S., 3,588,708.

Varmola, Keijo A.: *See—*
Fallenius, Kai B.; and Varmola, Keijo A.,3,588,685.

Veasman, Frank Kenneth, to Buffalo Brake Beam Company. Fabricated brake beam truss and method of making same. 3,587,791, Cl. 188-225.6

VEB Reglerwerk Dresden: *See—*
Kong, Gerhard; and Pieloth, Manfred, 3,587,607.

Veb Sachsenring Automobilwerke Zwickau Schliessfach: *See—*
Weichelt, Wolfgang, 3,587,534.

VEB Tabak-und Industriemaschinen Dresden: *See—*
Wilde, Friedrich; and Herrmann, Johannes, 3,587,593.

Vechkanov, Konstantin Mikhailovich: *See—*
Anufriev, Viktor Vasilievich; Vechkanov, Konstantin Mikhailovich; and Zemlyannikov, Konstantin Feoktistovich,3,587,695.

Veeder Industries Inc.: *See—*
Dilger, Lawrence, 3,588,459.
Lapointe, Lloyd J., 3,588,476.

Venison, Douglas Michael; and Allen, George, to Matthew Hall Mechanical Services Limited. Sprinkler alarm valve. 3,587,746, Cl. 169-19.

Vereingte Deutsche Metallwerke AG: *See—*
Theobald, Reiner; and Luc-Belmont, Stephane, 3,587,915.

Vereinigte Kesselwerke Aktiengesellschaft: *See—*
Mutke, Reinhold; and Steller, Peter, 3,587,488.

Vereinigte Osterreichische Eisen-und Stahlwerke Aktiengesellschaft: *See—*
Puhringer, Othmar; and Holik, Karl, 3,587,760.

Verhoeven, Leonardus Adrianus Johannes; and Dollekamp, Hendrikus, to U.S. Philips Corporation. Apparatus for maintaining color balance despite variations of the supply voltage. 3,588,328, Cl. 178-5.4

Vermette, Howard H. Device for elevating, as well as tipping or tilting drums, barrels, containers and the like to dump the contents therefrom. 3,587,892, Cl. 214-313.

Vermillion, Charles H., to United States of America, National Aeronautics and Space Administration. Facsimile video remodulation network. 3,588,331, Cl. 178-6.

Vermont American Corporation: *See—*
Cowley, William E.; and McCord, Wilfred M., Jr., 3,587,626.

Vero Precision Engineering Limited: *See—*
Oxenham, John, 3,587,360.

Verplank, William L., to Foster-Miller Associates. Vortex fluid mixture control valve. 3,587,605, Cl. 137-81.5

Verwaltungsgesellschaft Moeller und Neumann: *See—*
Reichrath, Ernst Georg; and Buchheit, Otto Karl, 3,588,044.

Vetco Offshore Industries, Inc.: *See—*
Miller, William F., 3,587,733.

Vetere, John J., to Sylvania Electric Products Inc. Electric lamp with heat reflector. 3,588,564, Cl. 313-43.

Vicentini, Arnaldo; and Sonaglioni, Demetrio, to Societa Italiana Telecomunicazioni Siemens S.p.A. Gating network for time-sharing communication system. 3,588,539, Cl. 307-246.

Vick, Ralph L., to Bendix Corporation, The. Hydraulic circuit breaker. 3,587,393, Cl. 91-29.

Vickers Limited: *See—*
O'Riley, Kenneth Walter, 3,588,442.

Victor Company of Japan, Limited: *See—*
Takimoto, Tetsuro, 3,588,780.

Vigil Security Limited: *See—*
Munton, Edward A., 3,587,484.

Vinciguerra, Costantino, to Nuovo Pignone S.p.A. Device for regulating, by reflux through the inlet- valve, the sucked flow for reciprocating compressors. 3,588,292, Cl. 417-446.

Vincoli, Armando, to Santoni & C.-S.p.A. Device for the operation of members in circular machines for stockings, socks and the like. 3,587,251, Cl. 66-8.

Vining, Thomas F., to Shell Oil Company. Electrode assembly. 3,588,580, Cl. 314-130.

Vinnicombe, Gordon: *See—*
Deakin, Gordon Asquith; Eastwood, Alan; and Vinnicombe, Gordon,3,587,819.

Vinsani, Mario: *See—*
Bertolini, Gianni; and Vinsani, Mario,3,588,666.

Vinzelberg, Bernhard: *See—*
Kampf, Gunther; Vinzelberg, Bernhard; and Walz, Helmut,3,588,429.

Viosca, Harry L., Jr., to United States of America, Navy. Circuit patching devices. 3,588,399, Cl. 200-51.1

Visi-Trol Engineering Company: *See—*
Connolly, Patrick W., 3,587,909.

Visor Mirror Corporation: *See—*
Lambert, Charles E., 3,588,233.

Vockenhuber, Karl: *See—*
Holler, Hermann, 3,587,431.

Vogel, Charles B. Board game apparatus. 3,588,114, Cl. 273-131.

Vogt, Dieter: *See—*
Fussner, Paul; Hirsch, Gunter; and Vogt, Dieter,3,587,977.

Vogt, Gerd: *See—*
Schrewe, Hans; Kobusch, Helmut; Liestmann, Wolf-Dietrich; Carius, Wolfhard; Vom Ende, Hans; Frenken, Klaus; and Vogt, Gerd,3,587,719.

Voight, Robert W.; and Moore, Robert G., Jr., to Bendix Corporation, The. Torque coupling device. 3,588,154, Cl. 287-108.

Voith Getriebe KG: *See—*
Orend, Friedrich, 3,587,385.

Volkers Research Inc.: *See—*
Willie, Edward N.; and Volkers, Walter K., 3,588,902.

Volkers, Walter K.: *See—*
Willie, Edward N.; and Volkers, Walter K.,3,588,902.
Willie, Edward N.; and Volkers, Walter K.,3,588,902.

Vollink, Gilbert J., to Rowe International, Inc., mesne. Remote loudness control. 3,588,354, Cl. 179-1.

Vom Ende, Hans: *See—*
Schrewe, Hans; Kobusch, Helmut; Liestmann, Wolf-Dietrich; Carius, Wolfhard; Vom Ende, Hans; Frenken, Klaus; and Vogt, Gerd,3,587,719.

Von Brecht, Forrest G.; and Pratt, Ryder. Package and method of packaging a product. 3,587,839, Cl. 206-46.

Vondrak, Mary Frances, to Shell Oil Company. Sulfur-hydrocarbon slurry pipeline transportation. 3,588,183, Cl. 302-66.

Vonk, Marinus Arnoldus, to U.S. Philips Corporation. Magnetron and connection system for magnetron. 3,588,589, Cl. 315-39.53

Von Zeppelin, Kurt: *See—*
Ganter, Wolfgang; and Von Zeppelin, Kurt,3,587,224.

Vuichard, Michel Antoine Emile: *See—*
Bonga, Benno Ibo; Lehmann, Hans Rudolf; and Vuichard, Michel Antoine Emile,3,588,196.

Waaben, Sigurd G.: *See—*
Lynes, Dennis J.; Shichman, Harold; and Waaben, Sigurd G.,3,588,849.

Wagner Research Corporation: *See—*
Flanagan, Thomas L., 3,588,089.

Wagner, Theodor M.: *See—*
Ball, Henry; and Wagner, Theodor M.,3,588,325.

Wainscott, Dain D., to Lincoln AG-Products, Inc. Plate wear indicator. 3,587,516, Cl. 116-114.

Wald, Herbert, to Bethlehem Steel Corporation. Furnace cover lifting means. 3,588,163, Cl. 294-67.

Walk, Georg: *See—*
Reiners, Franz; and Walk, Georg,3,587,368.
Reiners, Franz; and Walk, Georg,3,587,369.

Walker, Frank A., Jr., to Master Specialties Company. Panel seal. 3,587,184, Cl. 40-130.

Walker, Grant W.: *See—*
Duckett, John W.; Walker, Grant W.; and Ford, Duane B.,3,588,159.
Ford, Duane B.; and Walker, Grant W.,3,588,158.
Rich, John W.; and Walker, Grant W.,3,587,787.

Walker, Jack M., to Chattanooga Pharmacal Company. Pack for applying therapeutic moist heat. 3,587,578, Cl. 128-268.

Walker, Jonas: *See—*
Oppenheim, Henry; and Walker, Jonas,3,587,378.

Wall, Earle R., Jr., to General Motors Corporation. Variable vane cascades. 3,588,269, Cl. 415-161.

Wall Street Dynamics, Inc.: *See—*
Caywood, Shirley A.; and Neuvirth, Clarence L., 3,588,260.

Wallace, Floyd L.: *See—*
Breitfuss, Thomas K.; Wallace, Floyd L.; and Zicaro, Joseph P.,3,587,659.

Wallick, Calude R., Jr., to American Standard Inc. Extrusion prevention means. 3,588,080, Cl. 269-25.

Wallingford, Clarence Robert, to Hazeltine Research, Inc. Signal generating circuits using internal semiconductor capacitance. 3,588,544, Cl. 307-268.

Wallingford, Errol E.; and Morris, Ronald Bruce, to Minister of National Defense, Her Majesty the Queen in right of Canada. Adaptive encoder and decoder. 3,588,364, Cl. 179-15.

Walls, Donald C.: *See—*
Montone, Liber J.; and Walls, Donald C.,3,588,347.

Walsh, Robert A.: *See—*
Fricke, Louis H., Jr.; and Walsh, Robert A.,3,588,487.

Walter, Florian A.: *See—*
Stewart, Edward C.; and Walter, Florian A.,3,588,198.

Walter, Reinhard Jurgen Joachim; and Helbig, Roland, to Hengstler, J., K.G. Zahlerfabrik. Electromagnetic drive for an add-substract-decade-counter. 3,588,458, Cl. 235-92.

Walters, John D. Four way valve. 3,587,647, Cl. 137-625.25

Walters, Leslie K.; and Hartman, Lee E., to General Motors Corporation. Power transmission and transmission lubricating system. 3,587,783, Cl. 184-11.

Walters, Leslie K.: *See—*
Keller, Robert C.; and Walters, Leslie K.,3,587,351.

Walther-Buromaschinen GmbH: *See—*
Buch, Hans-Joachim, 3,588,549.

Walz, Helmut: *See—*
Kampf, Gunther; Vinzelberg, Bernhard; and Walz, Helmut,3,588,429.

Wandel & Goltermann: *See—*
Heidenreich, Karl-Heinz; and Neuscheler, Friedrich, 3,588,614.

Wanlass, Bert R., to General Motors Corporation. Power transmission including friction drive and gear drive. 3,587,350, Cl. 74-800.

Wanschek, Larry: *See—*
Halinski, Michael J.; and Wanschek, Larry,3,588,608.

Ward, Henry D., Jr.; and Ward, William F., to Ward-Turner Machinery Company, The. Suction feeder bar for warped sheets. 3,588,093, Cl. 27I-32.

Ward, Henry D., Jr.; Ward, William F.; and Bachmann, John H., Jr., to Ward-Turner Machinery Company, The. Suction table system for feeding of warped sheets. 3,588,095, Cl. 271-44.

Ward, Irving A., to Modern Faucet Mfg. Co. Flush valve. 3,587,117, Cl. 4-55.

Ward, Irving A., to Modern Faucet Mfg. Co. Spray valve. 3,588,040, Cl. 251-244.

Ward, James E. Powered wire tying tool. 3,587,668, Cl. 140-93.6

Ward, Owen K.: *See—*
Brown, Scott W.; and Ward, Owen K.,3,587,854.

Ward, William F.: *See—*
Ward, Henry D., Jr.; and Ward, William F.,3,588,093.
Ward, Henry D., Jr.; Ward, William F.; and Bachmann, John H., Jr.,3,588,095.

Ward-Turner Machinery Company, The: *See—*
Ward, Henry D., Jr.; and Ward, William F., 3,588,093.
Ward, Henry D., Jr.; Ward, William F.; and Bachmann, John H., Jr., 3,588,095.

Ware, James M.: *See—*
Beauchamp, George D.; and Ware, James M.,3,587,290.

Warner & Swasey Company, The: *See—*
Gano, John W.; and Kline, Lester H., 3,587,886.
Schuman, Ralph H., 3,587,798.

Warren, William H. Transferring horizontal batches of articles to a different level. 3,587,888, Cl. 214-146.5

Washington University: *See—*
Rosenbaum, Fred J., 3,588,704.

Wasileski, Norbert J., to General Electric Company. Electrical control device panel assembly with multi-functional insulating support means. 3,588,620, Cl. 317-119.

Wasser, Willi: *See—*
Herzhoff, Peter; Gref, Hans; Schweicher, Wolfgang; Wasser, Willi; Browatzki, Kurt; Friedsam, Joseph; and Heidenreich, Max,3,587,962.

Watson, James H. P., to Corning Glass Works. Magneto-optical process for determining superconductivity. 3,588,223, Cl. 350-151.

Watson, Robert, & Company (Constructional Engineers) Limited: *See—*
Chiffey, Edward, 3,588,418.

Watters, Edward C., Jr.; and Moore, Thomas M., to Westinghouse Electric Corporation. Apparatus and method for improving the velocity response of a MTI radar by sinusoidally varying the interpulse period. 3,588,898, Cl. 343-7.7

Wavre, Andre, to Westinghouse Electric Corporation. Power multiplexing system. 3,588,518, Cl. 307-38.

Wayne Manufacturing Company: *See—*
Tamny, Simon; and Tyler, James B., 3,587,213.

Weatherhead Company, The: *See—*
Mundt, James E.; and Powell, Milan, 3,587,157.

Weaver, Rufus J.; and Gaetano, Anthony J. Vehicle jack and assembly therefor. 3,588,046, Cl. 254-85.

Webster, Ronald B.: *See—*
Logan, David Jopson; Webster, Ronald B.; Pavone, Robert Joseph; and Richardson, David Gilmer, Jr.,3,588,081.

Weeth, Waldo W. Irrigation system. 3,587,972, Cl. 239-212.

Weghaupt, Erich: *See—*
Lambrecht, Dietrich; and Weghaupt, Erich,3,587,638.

Wehmer, Bruno F.: *See—*
Cater, Jack; Johnson, Fred W.; and Wehmer, Bruno F.,3,588,119.

Wehr, Georg; Gotze, Gotthold; and Heesch, Hans, to Rotenburger Metallwerke GmbH. Apparatus for de-branching and/or de-barking felled trees. 3,587,681, Cl. 144-2.

Weichelt, Wolfgang, to Veb Sachsenring Automobilwerke Zwickau Schliessfach. Suction system for rotary piston internal combustion engines. 3,587,534, Cl. 123-8.13

Weidner, Walter J. Method and apparatus for resurfacing steel molds. 3,587,386, Cl. 90-12.

Weineck, Hans; and Laturell, Edgar, to Huttenwerk Oberhausen AG. Guide-rail assembly for pusher-type furnace. 3,588,059, Cl. 263-6.

Weingarten, Maxwell H.; and Weingarten, Robert J. Power generating means. 3,587,227, Cl. 60-1.

Weingarten, Robert J.: *See—*
Weingarten, Maxwell H.; and Weingarten, Robert J.,3,587,227.

Weinstock, Jacques J.; and Hay, William D., to Unit Process Assemblies, Inc. Beta backscatter thickness measuring apparatus for apertures in printed circuit boards and the like. 3,588,507, Cl. 250-83.3

Weintraub, Warren S.: *See—*
Mc Bride, Richard A.; Herbert, Reginald S.; and Weintraub, Warren S.,3,588,708.

Weisbord, Leon: *See—*
Riordan, Hugh E.; Parker, Bernard; and Weisbord, Leon,3,587,326.

Weisbrod, Sherman: *See—*
Chang, Kern K. N.; Prager, Hans John; and Weisbrod, Sherman,3,588,735.

Weiss, Morton A.; and Speckhart, Bernard S., to White Machine Co. Trolley hanger assembly. 3,587,473, Cl. 104-93.

Weist, Edward Landis: *See—*
Demler, Henry William, Sr.; and Weist, Edward Landis,3,588,149.

Weisz, William, to Singer Company, The. Sewing needle clamp. 3,587,498, Cl. 112-226.

Weitz, William E., Jr.: *See—*
Folson, Theodore R.; Weitz, William E., Jr.; and Tennant, David A.,3,588,257.

Welch, William P.: *See—*
Ortolano, Ralph J.; Welch, William P.; and Semar, Harold W.,3,588,278.

Wellford, Armistead L.; and Culler, John H., to General Electric Company. Current drive arrangement for symmetrical switching circuits. 3,588,669, Cl. 321-45.

Wells, Louis: *See—*
Berry, Morris J.; and Wells, Louis,3,587,795.

Wells, Paul S.; Henderson, Stephen P.; and Norgaard, Loring C., said Norgaard assor. to said Wells and said Henderson. Partially submersible carrier vessel. 3,587,505, Cl. 114-43.5

Wells Television, Inc.: *See—*
Scher, Harry, 3,588,336.

Wells, Willard H.: *See—*
Paine, T. O., Acting Administrator of the National Aeronautics and Space Administration with respect to an invention of,; and Wells, Willard H.,3,588,220.

Welti, George R., to Westinghouse Electric Corporation. Non-linear phase detector. 3,588,734, Cl. 331-12.

Wendroff, Benjamin: *See—*
Perry, Charles W.; and Wendroff, Benjamin,3,587,745.

Wendt, Georg, to CSF-Compagnie Generale de Telegraphie Sans Fils. Apparatus for making large-area homogeneous photocathodes. 3,588,468, Cl. 219-271.

Wentzell, Joseph M., to Homogeneous Metals, Inc. Apparatus for powdering metals. 3,588,071, Cl. 266-34.

Werding, Winfried Joseph. Brush box. 3,588,263, Cl. 401-125.

Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See—*
Muller, Walter; and Fischer, Pius, 3,588,194.
Suter, Xaver; Schubert, Dale W.; and Ezekiel, Frederick D., 3,588,004.

Wernicke, Walter Henry, to Carter, James B., Ltd. Automotive block heater. 3,587,548, Cl. 123-142.5

Werthmuller, Hans: *See—*
Feier, Kurt; and Werthmuller, Hans,3,587,458.

Wessells, Forrest A.: *See—*
Addy, William D.; and Wessells, Forrest A.,3,588,079.

Wessels, Forrest Ashton, to Grace, W. R., & Co. Saddle mounting for flexible thin printing plates. 3,587,464, Cl. 101-415.1

West Company, The: *See—*
Rohde, Le Roy H., 3,587,897.

Western Company of North America, The: *See—*
Spencer, Arthur M.; Anderson, Arthur L.; and Dysart, Gordon R., 3,587,744.

Western Electric Company, Incorporated: *See—*
Harris, Richard A., 3,588,388.
Harris, Richard A., 3,588,867.
Keating, John M., 3,587,524.
Marvin, William H., 3,588,624.
Montone, Liber J.; and Walls, Donald C., 3,588,347.

Westinghouse Air Brake Company: *See—*
Cannon, John G., 3,588,185.
Feucht, Jacob E., 3,587,753.
Jeffrey, William B., 3,588,184.
Worbois, Robert J., 3,588,186.

Westinghouse Brake and Signal Company, Limited: *See—*
Shattock, Charles F. B., 3,588,188.

Westinghouse Electric Corporation: *See—*
Beese, Norman C., 3,588,572.

Benke, Frank W.; and Uitto, Gary E., 3,587,169.
Berry, William R., 3,588,265.
Buck, Daniel C.; and Peterson, Noel C., 3,588,759.
Buck, Daniel C., 3,588,901.
Buckingham, Arthur G.; Miller, James A.; and Shapiro, George, 3,588,000.
Buckwalter, Richard H., 3,588,769.
Carothers, Charles H., 3,588,773.
Chen, Cheng-Lin; Zollweg, Robert J.; and Ennulat, Dietrich F., 3,588,573.
Cricchi, James Ronald, 3,588,526.
Cricchi, James Ronald, 3,588,527.
Ellsworth, James P.; and Thomas, Glenn R., 3,588,772.
Frink, Russell E.; and Milianowicz, Stanislaw A., 3,588,407.
Geffe, Philip R., 3,588,725.
Guentner, Robert L., 3,588,498.
Hellstrom, Melbourne J.; and Laughinghouse, Charles L., 3,588,535.
Hoyler, Robert C., 3,588,709.
Kilgore, Lee A.; Fergestad, Ragnvald; and Schanche, Tor, 3,588,557.
Kircher, Paul J., 3,587,445.
Koerner, Harry E., 3,588,500.
Lambden, Joseph F.; and Thompson, John E., 3,588,611.
Lockie, Arthur M., 3,588,688.
Luebrecht, Richard E., 3,588,519.
Masters, Harvey M., 3,588,710.
Maxwell, Richard F., Jr.; and Kaisler, Francis J., 3,588,517.
Mc Carthy, Joseph A., 3,587,263.
McGinnis, Ralph E., 3,588,279.
Michael, Jacob F., 3,588,579.
Moreland, William C., II, 3,587,556.
Nickel, Donald L., 3,587,908.
O'Keeffe, Terence W., 3,588,570.
Ortolano, Ralph J.; Welch, William P., and Semar, Harold W., 3,588,278.
Perez-Stable, Nicolas L., 3,588,610.
Rhoto, Richard S., 3,588,533.
Ristuccia, Donald J., 3,588,606.
Ristuccia, Donald J.; and Klein, Kenneth R., 3,588,607.
Savino, Henry C., 3,587,786.
Siviy, George, 3,588,398.
Thomas, Eugene P., 3,587,568.
Watters, Edward C., Jr.; and Moore, Thomas M., 3,588,898.
Wavre, Andre, 3,588,518.
Welti, George R., 3,588,734.
Willard, Frank G.; and Sutherland, James F., 3,588,665.
Yamasaki, George R., 3,588,601.

Weston Instruments Division: *See—*
Barbas, Joseph, Jr.; Paulauskas, Justin V.; and Peterson, William C., 3,588,515.

Westphal, Dieter; and Mobus, Gunter, to Joh. Vaillant KG. Piezoelectric lighter. 3,588,553, Cl. 310-8.7

Weyerhaeuser Company: *See—*
Blickenderfer, Charles, Jr.; Erickson, Harold E.; and Clapp, Charles C., 3,587,153.

Wheeler, Melvin James. Pipe handling cradle. 3,588,164, Cl. 294-74.

Wheeling-Pittsburgh Steel Corporation: *See—*
Tradler, Marvin M., 3,587,993.

Wheelock, Richard A.; and Evans, Elmer C. Vehicle turn signal. 3,588,812, Cl. 340-55.

Whirlpool Corporation: *See—*
Braga, Albert T.; and Ruspino, James G., 3,588,213.
Nystuen, Arne M.; and Neumann, Gerhard W., 3,587,939.

White, Albert J. Adaptive missile guidance systems. 3,588,002, Cl. 244-3.14

White, Arthur Roger: *See—*
Beach, John Myers; Oglesbee, Edgar Crain; White, Arthur Roger; Ziegler, George Stephen; and Cecil, Harry Hamilton,3,587,788.

White, Frank F., to Automatic Development Corporation. Tube and bar feeder. 3,587,822, Cl. 198-26.

White Machine Co.: *See—*
Weiss, Morton A.; and Speckhart, Bernard S., 3,587,473.

White, Stanley E.; Platt, Eric G.; and Olson, Walter L., to International Telephone and Telegraph Corporation. Monitor and alarm circuit for self-seeking network. 3,588,367, Cl. 179-18.

Whited, Arthur R., Jr.: *See—*
Connett, Donald C.; and Whited, Arthur R., Jr.,3,587,403.

Whitehouse, George M., to Laboratory for Electronics, Inc. Four-way valve and actuator. 3,587,644, Cl. 137-624.13

Whiting, Jerry M., to Atlantic Richfield Company. Methods for mining deep thick oil shale deposits. 3,588,175, Cl. 299-11.

Whittaker Corporation: *See—*
Foley, James J., 3,587,299.
Loewenstein, Paul, 3,587,282.
Negoro, Kaiji, 3,588,033.

Wichita Clutch Company, Inc.: *See—*
Moss, Jack W., 3,587,331.

Widman, Michael V.: *See—*
Adkins, David E.; Legue, Ronald L.; and Widman, Michael V.,3,587,756.

Widmer, Elva G.: *See—*
Widmer, John R.; and Widmer, Elva G.,3,587,706.

Widmer, John R.; and Widmer, Elva G. Automobile window screen. 3,587,706, Cl. 160-105.

Wieder, Harold, to International Business Machines Corporation. Laser infrared image converter. 3,588,508, Cl. 250-83.3

Wieland, Roman G., to Tri W-G, Inc. Therapeutic treatment table. 3,587,482, Cl. 108-147.

Wienert, Lloyd C.; Fitzgerald, Lynn; Sturges, Hiram A.; and Johnson, Henry T. Livestock feeder. 3,587,529, Cl. 119-51.5

Wilcox, Donald C.: *See—*
Smith, Henry E.; and Wilcox, Donald C.,3,587,811.

Wilcox, Merton, to Sarasota Engineering Co., Inc. Selective vehicle detector. 3,588,806, Cl. 340-38.

Wilczynski, Janusz S.; and Tibbetts, Raymond E., to International Business Machines Corporation. Variable reduction lens systems. 3,588,228, Cl. 350-215.

Wilde, Friedrich; and Herrmann, Johannes, to VEB Tabak-und Industriemaschinen Dresden. Method and apparatus for producing a tobacco rod. 3,587,593, Cl. 131-84.

Wildenberg, Arthur A.: *See—*
Taylor, Oliver E.; and Wildenberg, Arthur A.,3,587,984.

Wildi, Paul, to Gulf Energy & Environmental Systems, Inc. Apparatus for cracking laminated structures. 3,587,957, Cl. 225-104.

Wilhelm, Donald F.: *See—*
Furfaro, Blase J.; and Wilhelm, Donald F.,3,588,695.

Wilkinson, Lawrence E.: *See—*
Howard, Norman C.; and Wilkinson, Lawrence E.,3,588,031.

Wilkinson, Wilfred Henry; and Cooper, Paul William, to Rolls-Royce Limited. Blade assembly for a fluid flow machine. 3,588,267, Cl. 415-135.

Willard, Frank G.; and Sutherland, James F., to Westinghouse Electric Corporation. Transformer inverter. 3,588,665, Cl. 321-2.

Willard, Henry G., to General Electric Company. Circuit breaker with short circuit magnetic tripping means. 3,588,762, Cl. 335-16.

Willett, Harold A.; and Giardina, Jacob A., to Cane Machinery & Engineering Co., Inc. Sugar cane harvester. 3,587,214, Cl. 56-17.

Williams, Andrew S., to Becton, Dickinson and Company, mesne. Physiological monitoring system. 3,587,562, Cl. 128-2.06

Williams, Chester I. Two-stage form-securing system. 3,588,026, Cl.

Williams, Gordon L.: *See—*
Brearley, Lawrence E.; Jensen, Stanley M.; Subik, Vincent P.; and Williams, Gordon L.,3,588,615.

Williams, Ioan Hugh, to Telephone Manufacturing Company Limited. Digital low pass filters. 3,588,548, Cl. 307-295.

Williams, James L., to North American Rockwell Corporation. Bulkhead connector means. 3,588,781, Cl. 339-12.

Williams, Lenord: *See—*
Foster, Donald L.; and Williams, Lenord,3,587,438.

Willie, Edward N.; and Volkers, Walter K., deceased0 (by Volkers, Daphne), to Volkers Research Inc. Short resonated antenna with step down transformer to improve resonant gain. 3,588,902, Cl. 343-745.

Willinger, Allan H., to Metaframe Corporation, mesne. Wire handle joining means. 3,588,153, Cl. 287-78.

Willis, Gordon, to Computervision Corporation. Extensible eccentric linkage. 3,587,334, Cl. 74-89.

Willson, Jack E.: *See—*
Seccombe, Robert J.; and Willson, Jack E.,3,587,269.

Wilson, Andy R., Jr. Self-pressure generating fluid powered actuator. 3,587,407, Cl. 92-82.

Wilson, George R., to Tektronix, Inc. Regulator controlled by voltage across semi- conductor junction device. 3,588,672, Cl. 323-4.

Wilson, Ivan L., to Atomic Energy of Canada Limited. Pressure relief valve. 3,587,623, Cl. 137-246.22

Wilson, Paul R. Vehicular transportation system and apparatus. 3,587,470, Cl. 104-149.

Windmoller & Holscher: *See—*
Rochla, Kurt, 3,587,824.

Wing, Ralph L., to Grace, W. R., & Co. Package of bags. 3,587,843, Cl. 206-57.

Wing, Ralph L., to Grace, W. R., & Co. Package of bags. 3,587,844, Cl. 206-57.

Wing, Ralph L., to Grace, W. R. & Co. Package of bags. 3,587,845, Cl. 206-57.

Winn, Charles S.: *See—*
Lunt, Judith Lee, 3,588,169.

Winters, Lloyd V.: *See—*
Avery, Carl F., Jr.; Pearson, Ernest A.; and Winters, Lloyd V.,3,587,920.

Wirsing, Howard L.: *See—*
Lee, David K. K.; and Wirsing, Howard L.,3,588,369.

Wittenwyler, Clifford V.; and Torrest, Robert S., to Shell Oil Company. Consolidation of shallow formations with acid modified epoxy resinous material. 3,587,742, Cl. 166-295.

Wittmann, Horst R., to United States of America, Army. Temperature tunable laser diode spectrograph. 3,588,253, Cl. 356-93.

Wohr, Rolf: *See—*
Grozinger, Alfred; and Wohr, Rolf,3,588,617.

Wold, Robert A., to Raychem Corporation. Attaching device for convoluted tubing. 3,588,150, Cl. 285-381.

Wolf, Jeremiah P.; Sutherland, William V.; and Dusa, Donald J., to General Electric Company. Propulsion nozzles with improved sound suppression. 3,587,973, Cl. 239-265.13

Wolff, Martin J., to Sperry Rand Corporation. Manicuring attachment for electric dry shaver. 3,587,596, Cl. 132-73.6

Woltche, Walter; and Elle, Klaus, to Schneider, Jos, & Co. Photographic objective with four air-spaced singlets. 3,588,229, Cl. 350-221.

Wood, Charles P., Jr., to Midwest Research & Development Corporation. Thermal differential sensor for refrigeration systems. 3,587,244, Cl. 62-126.

Wood Industries, Inc.: *See—*
Polglase, Burton C., 3,587,461.

Wood, Robert E., to Sycor Inc. Reversing drive means for tape reels and the like. 3,587,997, Cl. 242-201.

Woods, Auburn, Jr.: *See—*
Cunningham, McCleery B.; Woods, Auburn, Jr.; and Dunlap, Charles K., Jr.,3,587,656.

Woods, Norman W., to Keeprite Products Limited. Window mount curtains for room air conditioner. 3,587,441, Cl. 98-94.

Worbois, Robert J., to Westinghouse Air Brake Company. Locomotive brake control apparatus suited for remote multiple unit operation. 3,588,186, Cl. 303-20.

Wormser, Robert S., to Game-Time, Inc. Playground swing support adapter. 3,588,021, Cl. 248-317.

Worthington Corporation: *See—*
Potter, Olin E.; and Tomasi, Biagio J., 3,588,288.

Wright, Barry, Corporation: *See—*
Suter, Xaver; Schubert, Dale W.; and Ezekiel, Frederick D., 3,588,004.

Wright, Carl Macey, to RCA Corporation. J-K' flip-flop using direct coupled gates. 3,588,545, Cl. 307-289.

Wright, E. T., & Co., Inc.: *See—*
Bernier, Louis E.; and Giblin, James P., 3,587,181.

Wright, Jack D.: *See—*
Howald, Werner E.; and Wright, Jack D.,3,588,277.

Wurlitzer Company, The: *See—*
Gschwandtner, Eric, 3,588,310.

Wyman, Howard John, to Rootes Motors Limited. Mounting members. 3,588,008, Cl. 248-15.

X. Film processing machine. 3,587,435, Cl. 95-93.

Xerox Corporation: *See—*
Budenstein, Irwin R.; Reed, Richard J.; and Johnson, Arthur U., 3,587,812.
Galster, Thomas H.; and Hess, Thomas W., 3,588,472.
Harris, Halbert M.; Headd, Franklin L.; Huber, Charles L.; Rugaber, Robert H.; and Tilly, Ralph R., 3,588,335.
Hopkins, Charles L., 3,588,445.
Monk, John, 3,588,329.
Tubinis, Matthew P., 3,588,584.

Xpress Automation, Inc.: *See—*
Engelhardt, Max; and Ziehm, Kurt F., Jr., 3,587,280.

Yamamoto, Manabu; Murayama, Seiichi; and Matsuno, Hiromitsu, to Hitachi, Ltd. Device for bending a plasma flame. 3,588,594, Cl. 315-111.

Yamamoto, Shinji, to Hitachi Ltd. Character recognition apparatus for identifying characters by detecting stroke features of the characters. 3,588,822, Cl. 340-146.3

Yamamoto, Tadaaki; and Takenaka, Hiroshi, to Nippon Kogaku K. K. Lens system for focussing two spaced objects on the same focal plane. 3,588,227, Cl. 350-194.

Yamasaki, George R., to Westinghouse Electric Corporation. Radio frequency spectral emission and detector device. 3,588,601, Cl. 315-344.

Yamauchi, Shinya; and Morita, Minoru, to Matsushita Electric Industrial Co., Ltd. Apparatus for producing grids of storage batteries. 3,587,717, Cl. 164-276.

Yamawaki, Ichiro. Howling elimination system for use in simultaneous two-way communicating device and a howlingless simultaneous two-way communicating device. 3,588,352, Cl. 179-1.

Yamazaki, Takeo. Foot operated hand released parking brake. 3,587,342, Cl. 74-540.

Yanagidaira, Hidetaka: *See—*
Kawai, Kazuo; Shintani, Sotokichi; and Yanagidaira, Hidetaka,3,588,349.

Yanagisawa, Yuzuru: *See—*
Uemura, Saburo; and Yanagisawa, Yuzuru,3,588,571.

Yanagishita, Kazuo; and Kano, Takanori, to Mitsubishi Denki Kabushiki Kaisha. Neutron monochromator. 3,588,509, Cl. 250-845.

Yanaka, Takashi, to Nihon Denshi Kabushiki Kaisha. Apparatus for correcting electron beam deflection. 3,588,586, Cl. 315-18.

Yareck, Michael J., to Bendix Corporation, The. Multiplier circuit. 3,588,713, Cl. 328-160.

Yasukawa, Shozo; and Aoshika, Masayuki, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Heating method for direct-arc furnace. 3,588,309, Cl. 13-34.

Yata, Kintaro, to Minolta Camera Co., Ltd. Camera shutter timing mechanism. 3,587,433, Cl. 95-53.

Yates, Donald B., to Pullman Incorporated. Hose hanger arrangement for railway car trainline. 3,587,868, Cl. 213-1.

Yawata Iron & Steel Co., Ltd.: *See—*
Akuta, Tomohiko; and Seya, Atsumi, 3,587,758.

Yedidiah, Shmariahu. Inducers for centrifugal pumps. 3,588,280, Cl. 416-200.

Yissum Research Development Company: *See—*
Brandstadter, Isaac Joseph, 3,588,592.

Yocum, William C., to Superior Valve Company. Quick-removable seal caps for fittings and the like. 3,587,654, Cl. 138-96.

Yopp, John L., to Union Tank Car Company. Top entry ball valve. 3,588,042, Cl. 251-315.

Yoshikawa, Shogo; and Tatsumi, Ryuji, to Nippon Electric Company, Limited. Exciter device for a solid state laser. 3,588,739, Cl. 331-94.5

Yoshino, Kunihiro, to Kabushiki Kaisha Tone Boring. Low-temperature fabrication of diamond-faced drilling bits. 3,587,358, Cl. 76-108.

Young, Einar T., to Sun Oil Company. Transmission for motor fuel dispensing apparatus. 3,587,337, Cl. 74-335.

Young, Einar T., to Sun Oil Company. Pressure relief device. 3,587,633, Cl. 137-551.

Young, Virgil F.; and Pebenito, Amable A., to Clary Datacomp Systems Inc. Magnetic card and tape reader-recorder. 3,588,379, Cl. 179-100.2

Young, Werner W. Street cleaning machine. 3,587,130, Cl. 15-352.

Yount, William R.: *See—*
Horlander, Frank J.; and Yount, William R.,3,588,380.

Zaffignani, Giovanni; and Mioc, Gualtiero, to Olivetti, Ing. C., & C., S.p.A. Control circuits for electric motors. 3,588,646, Cl. 318-221.

Zahid, Abduz: *See—*
Jacobellis, Alphonse A.; and Zahid, Abduz,3,587,653.

Zanders, Charles E.: *See—*
Freier, Gerald H.; and Zanders, Charles E.,3,588,121.

Zangheri, Daniel C.: *See—*
Dugeny, Pierre L.; Gerain, Jean R.; Quinaud, Michel C.; and Zangheri, Daniel C.,3,587,813.

Zappone, Charles M. Replacement window unit. 3,587,705, Cl. 160-91.

Zarowin, Charles B., to International Business Machines Corporation. Gas discharge plasma tube having a multiturn primary winding. 3,588,590, Cl. 315-57.

Zatsky, Norman Charles, to Timex Corporation. Electronic wrist watch. 3,587,223, Cl. 58-23.

Zechlin, Richard, to Fairbanks Morse Inc. Electronic ignition control system. 3,587,550, Cl. 123-148.

Zechlin, Richard: *See—*
Henderson, Robert M.; Miller, Lowell E.; and Zechlin, Richard,3,588,479.

Zeiss Ikon Aktiengesellschaft: *See—*
Hochstein, Roland; Borner, Gerhard; and Taesler, Rudolf, 3,588,239.

Zemlyannikov, Konstantin Feoktistovich: *See—*
Anufriev, Viktor Vasilievich; Vechkanov, Konstantin Mikhailovich; and Zemlyannikov, Konstantin Feoktistovich,3,587,695.

Zenith Equipment Manufacturing Company: *See—*
Hickman, John B., 3,587,807.

Zenith Radio Corporation: *See—*
Mac Lean, Gerald K.; and Pekosh, Raymond J., 3,588,567.

Zettlemoyer, Albert C.; and Bassett, David R., to Lehigh University. Freezing nucleation. 3,587,966, Cl. 239-2.

Zicaro, Joseph P.: *See—*
Breitfuss, Thomas K.; Wallace, Floyd L.; and Zicaro, Joseph P.,3,587,659.

Ziedonia, Janis Gunars, to Hoffmann-La Roche Inc. Ultrasonic transducer assembly for biological monitoring. 3,587,561, Cl. 128-2.06

Ziegler, George Stephen: *See—*
Beach, John Myers; Oglesbee, Edgar Crain; White, Arthur Roger; Ziegler, George Stephen; and Cecil, Harry Hamilton,3,587,788.

Ziehm, Gunter Hans; and Triebold, Karl-Friedrich, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Apparatus for compensating harmonic-dependent components in a direction-sensitive acoustic transducer system. 3,588,797, Cl. 340-6.

Ziehm, Kurt F., Jr.: *See—*
Engelhardt, Max; and Ziehm, Kurt F., Jr.,3,587,280.

Ziver, Garo M., to Corning Glass Works. Temperature control system for glass-ceramic cook-top. 3,588,448, Cl. 219-511.

Zmuda, Daniel A., to Oldberg Manufacturing Company. Internally knurled body and method and apparatus for forming same. 3,587,272, Cl. 72-122.

Zoller, Attila C. Bi-directional electromagentic pick-up device for stringed musical instruments. 3,588,311, Cl. 84-1.15

Zollner, Dieter: *See—*
Kegel, Kurt; Zollner, Dieter; Reichelt, Bernhard; and Koziol, Konrad,3,588,307.

Zollweg, Robert J.: *See—*
Chen, Cheng-Lin; Zollweg, Robert J.; and Ennulat, Dietrich F.,3,588,573.

Zubkov, Vyacheslav Ivanovich: *See—*
Smirnov, Oleg Alexandrovich; Zubkov, Vyacheslav Ivanovich; and Danilov, Viktor Petrovich,3,587,577.

Zumkeller, Oskar; and Roth, Werner, to Kiengle Apparate GmbH. Machine operation recorder. 3,588,910, Cl. 346-62.

CLASSIFICATION OF PATENTS

ISSUED JUNE 28, 1971

NOTE.—First number, class; second number, subclass; third number, patent number

2— 68	3,587,113	52— 73	3,587,197	72—450	3,587,288	83—651	3,587,382	104— 23	3,587,471	128— 2	3,587,560
207	3,587,114	582	3,587,199	73— 1	3,587,290	84— 1.13:	3,588,310	27	3,587,472	.05:	3,587,561
3— 1	3,587,115	741	3,587,198	12	3,587,291	.15:	3,588,311	93	3,587,473	.06:	3,587,562
4— 10	3,587,116	53— 22	3,587,200	15.4	3,587,292	88— 1.5	3,587,383	149	3,587,470		3,587,563
55	3,587,117	24	3,587,201	17	3,587,293	90— 7	3,587,384	173	3,587,474		3,587,564
146	3,587,118	39	3,587,202	49.5	3,587,294	11	3,587,385	105—287	3,587,475		3,587,565
242	3,587,119	112	3,587,203	64.1	3,587,295		3,587,391	377	3,587,476	12	3,587,566
5—260	3,587,120	138	3,587,204	65	3,587,296	12	3,587,386	378	3,587,477	24.5	3,587,567
7— 12	3,587,121	247	3,587,206	67.6	3,587,297		3,587,387	107— 8	3,587,478	33	3,587,568
9— 8	3,587,122	374	3,587,209		3,587,298	13.1	3,587,388	108— 51	3,587,479		3,587,569
400	3,587,123	381	3,587,207	.7	3,587,299	17	3,587,389		3,587,480	75	3,587,570
10—135	3,587,124		3,587,208		3,587,300	58	3,587,390	53	3,587,481	76	3,587,571
13— 1	3,588,305	55—103	3,587,210	88	3,587,301	91— 1	3,587,392	147	3,587,482	80	3,587,572
13	3,588,306	199	3,587,211	100	3,587,302	29	3,587,393	157	3,587,483	201	3,587,573
18	3,588,307	274	3,587,212	102	3,587,289	39	3,587,394	109— 25	3,587,484	204	3,587,574
31	3,588,308	300	3,587,213	103	3,587,303	47	3,587,395	48	3,587,485	215	3,587,575
34	3,588,309	56— 10.7	3,587,214	136	3,587,304	239	3,587,396	51	3,587,486	222	3,587,576
14— 6	3,587,125	327	3,587,215	.6	3,587,305	399	3,587,397	110— 7	3,587,487	254	3,587,577
71	3,587,126		3,587,216	139	3,587,307	419	3,587,398		3,587,488	268	3,587,578
15— 48	3,587,127		3,587,217	147	3,587,306	420	3,587,399	31	3,587,489	287	3,587,579
236	3,587,128	343	3,587,218	170	3,587,308	492	3,587,400	162	3,587,490	291	3,587,580
250.06:	3,587,129	57— 34	3,587,219		3,587,309	496	3,587,401	112—158	3,587,491		3,587,581
352	3,587,130	140	3,587,220		3,587,310	498	3,587,402	162	3,587,492		3,587,582
16— 95	3,587,131		3,587,221	180	3,587,311	504	3,587,403	181	3,587,493	296	3,587,583
18— 5	3,587,132	58— 2	3,587,222	204	3,587,312	505	3,587,404	184	3,587,494	327	3,587,584
	3,587,133	23	3,587,223	209	3,587,313	92— 5	3,587,405		3,587,495		3,587,585
	3,587,134	34	3,587,224	252	3,587,314	74	3,587,406	217	3,587,496	334	3,587,586
16	3,587,135	43	3,587,225	268	3,587,315	82	3,587,407	218	3,587,497	340	3,587,587
.5	3,587,136	59— 79	3,587,226	302	3,587,316	89	3,587,408	226	3,587,498	341	3,587,588
26	3,587,137	60— 1	3,587,227	342	3,587,317	93— 1	3,587,409	252	3,587,499	351	3,587,589
30	3,587,138	16	3,587,228	362	3,587,318	33	3,587,410	258	3,587,500	359	3,587,590
19— 66	3,587,139	39.16:	3,587,229	379	3,587,319	36.3	3,587,411	264	3,587,501	361	3,587,591
24—194	3,587,140	.28:	3,587,230	386	3,587,320	39	3,587,412	113— 1	3,587,502	395	3,587,592
205.17:	3,587,141		3,587,231	418	3,587,321	93	3,587,413	114— .5	3,587,503	131— 84	3,587,593
268	3,587,142	.72:	3,587,232	420	3,587,322		3,587,414	16	3,587,504	172	3,587,594
25— 41	3,587,143	51	3,587,233	421.5	3,587,323	94— 1.5	3,587,415	43.5	3,587,505	132— 46	3,587,595
118	3,587,144	52	3,587,234	423	3,587,324		3,587,416	51	3,587,506	73.6	3,587,596
28— 1.7	3,587,145		3,587,235	462	3,587,325	95— 1	3,587,417	200	3,587,507	134— 95	3,587,597
22	3,587,146		3,587,236	492	3,587,326	.1	3,587,418	115— .5	3,587,508	122	3,587,598
29— 25.15:	3,587,147	53	3,587,237	502	3,587,327		3,587,419	34	3,587,509	138	3,587,599
.16:	3,587,148		3,587,238	516	3,587,328	10	3,587,420		3,587,511	135— 33	3,587,600
81	3,587,149	61— 16	3,587,239	74— 3.54:	3,587,329		3,587,421	35	3,587,510	137— 67	3,587,601
105	3,587,150	62— 58	3,587,240	5.6	3,587,330	11	3,587,422	41	3,587,512	81.5	3,587,602
	3,587,151	63	3,587,241	11	3,587,331		3,587,423		3,587,513		3,587,603
116	3,587,152	77	3,587,242	54	3,587,332		3,587,424	116— 67	3,587,514		3,587,604
132	3,587,153	87	3,587,243	88	3,587,333		3,587,425	70	3,587,515		3,587,605
148.4	3,587,154	126	3,587,244	89	3,587,334	13	3,587,426	114	3,587,516		3,587,606
156.6	3,587,155	501	3,587,246	.15:	3,587,335	31	3,587,427	121	3,587,517		3,587,607
.7	3,587,156	503	3,587,245	242.11:	3,587,336	37	3,587,430	129	3,587,518		3,587,608
157.1	3,587,157	63— 14	3,587,247	335	3,587,337	44	3,587,431	137	3,587,519		3,587,609
203	3,587,158	64— 4	3,587,248	410	3,587,338	50	3,587,432	173	3,587,520		3,587,610
	3,587,159	7	3,587,249	.5	3,587,346	53	3,587,433	118— 7	3,587,521		3,587,611
	3,587,160	24	3,587,250	416	3,587,339	59	3,587,434	50	3,587,522		3,587,612
205	3,587,161	66— 8	3,587,251	469	3,587,340	93	3,587,435	.1	3,587,523		3,587,613
208	3,587,162	50	3,587,253	501	3,587,341	94	3,587,428	70	3,587,524		3,587,614
479	3,587,163	86	3,587,252	540	3,587,342		3,587,436	115	3,587,525		3,587,615
568	3,587,164		3,587,254	603	3,587,343	95	3,587,429	211	3,587,526		3,587,616
	3,587,165	68— 38	3,587,255	612	3,587,344	98— 1	3,587,437	324	3,587,527	85	3,587,617
577	3,587,166	177	3,587,256	688	3,587,345	.5	3,587,438	119— 16	3,587,528	87	3,587,618
592	3,587,167	181	3,587,257	759	3,587,347	2	3,587,439	51.11:	3,587,530	116	3,587,619
605	3,587,168	69— 43	3,587,258	797	3,587,348	.01:	3,587,440	.5	3,587,529	154	3,587,620
624	3,587,169	70—218	3,587,259	800	3,587,349	94	3,587,441	122—156	3,587,531	209	3,587,621
30— 40	3,587,170	395	3,587,260		3,587,350	110	3,587,442	356	3,587,532	220	3,587,622
.1	3,587,171	422	3,587,261	850	3,587,351	114	3,587,443	123— 8.09:	3,587,533	246.22:	3,587,623
246	3,587,172	456	3,587,262	868	3,587,352	99—282	3,587,444	.13:	3,587,534	344	3,587,624
251	3,587,173	72— 8	3,587,263		3,587,353	331	3,587,445	32	3,587,535	355.12:	3,587,626
346.5	3,587,174		3,587,264		3,587,354	339	3,587,446		3,587,536	398	3,587,625
33—205	3,587,175		3,587,265		3,587,355	425	3,587,447	41.12:	3,587,537	445	3,587,627
	3,587,176	13	3,587,268	76— 64	3,587,356	100— 3	3,587,448	45	3,587,538	456	3,587,628
34—156	3,587,177	16	3,587,266	107	3,587,357	30	3,587,449	90.35:	3,587,539	484.2	3,587,629
35— 6	3,587,178	21	3,587,267	108	3,587,358	117	3,587,450	102	3,587,540	504	3,587,630
26	3,587,179	60	3,587,270	81— 53.2	3,587,363	118	3,587,451	119	3,587,541	527	3,587,631
35	3,587,180	75	3,587,269	57.39:	3,587,364	256	3,587,452		3,587,542	543	3,587,632
36— 59	3,587,181	114	3,587,271	58.1	3,587,365	101— 1	3,587,453		3,587,543	551	3,587,633
37— 41	3,587,182	122	3,587,272	177	3,587,366	3	3,587,454		3,587,544	553	3,587,634
40— 83	3,587,183	133	3,587,273	82— 1	3,587,367	35	3,587,455	136	3,587,545	556	3,587,635
130	3,587,184	148	3,587,274	2.5	3,587,368	93	3,587,456	139	3,587,546	565	3,587,636
132	3,587,185	199	3,587,275		3,587,369	110	3,587,457		3,587,547	577.5	3,587,637
	3,587,186	227	3,587,276	3	3,587,370	114	3,587,458	142.5	3,587,548	580	3,587,638
159	3,587,187	234	3,587,277	44	3,587,371	128.3	3,587,459	148	3,587,549	595	3,587,639
336	3,587,188	237	3,587,278	83— 16	3,587,372	148	3,587,460		3,587,550	596.14:	3,587,640
43— 44.4	3,587,189	240	3,587,279	43	3,587,373	219	3,587,461		3,587,551	608	3,587,641
46— 43	3,587,190	257	3,587,280	56	3,587,374	287	3,587,462		3,587,552	614.21:	3,587,642
247	3,587,191	265	3,587,281	71	3,587,375	350	3,587,463	180	3,587,553	615	3,587,643
51—121	3,587,192	273	3,587,283	110	3,587,376	415.1	3,587,464	125— 15	3,587,554	624.13:	3,587,644
163	3,587,193	329	3,587,282	171	3,587,377	457	3,587,465	126— 1	3,587,555	625.17:	3,587,646
241	3,587,194	363	3,587,284	201.07:	3,587,378	102— 27	3,587,466	19	3,587,556	.21:	3,587,645
284	3,587,195	379	3,587,285	.10:	3,587,379	28	3,587,467	21	3,587,557	.25:	3,587,647
326	3,587,196	389	3,587,286	364	3,587,380	32	3,587,468	113	3,587,558	.44:	3,587,648
52— 64	3,587,205	402	3,587,287	424	3,587,381	79	3,587,469	271	3,587,559	.47:	3,587,649

137–625.65: 3,587,650
628 : 3,587,651
138– 26 : 3,587,652
30 : 3,587,653
96 : 3,587,654
120 : 3,587,655
144 : 3,587,656
154 : 3,587,658
156 : 3,587,657
172 : 3,587,659
139– 84 : 3,587,660
122 : 3,587,661
3,587,662
3,587,663
3,587,664
3,587,665
123 : 3,587,666
142 : 3,587,667
140– 1 : 3,587,673
93.6 : 3,587,668
141– 12 : 3,587,669
35 : 3,587,670
67 : 3,587,671
3,587,672
78 : 3,587,674
125 : 3,587,675
130 : 3,587,676
167 : 3,587,677
346 : 3,587,678
143– 32 : 3,587,679
157 : 3,587,680
144– 2 : 3,587,681
3 : 3,587,682
32 : 3,587,683
208 : 3,587,684
311 : 3,587,685
146– 55 : 3,587,686
78 : 3,587,687
94 : 3,587,688
105 : 3,587,689
117 : 3,587,690
130 : 3,587,691
160 : 3,587,692
192 : 3,587,693
3,587,694
3,587,695
222 : 3,587,696
150– .5 : 3,587,697
35 : 3,587,698
52 : 3,587,699
3,587,700
151– 21 : 3,587,701
152–158 : 3,587,702
209 : 3,587,703
159– 6 : 3,587,704
160– 91 : 3,587,705
105 : 3,587,706
178 : 3,587,707
164– 4 : 3,587,708
12 : 3,587,709
81 : 3,587,710
83 : 3,587,711
114 : 3,587,712
131 : 3,587,713
201 : 3,587,714
252 : 3,587,715
274 : 3,587,716
276 : 3,587,717
281 : 3,587,718
3,587,719
302 : 3,587,720
350 : 3,587,721
376 : 3,587,722
165– 5 : 3,587,723
8 : 3,587,724
32 : 3,587,725
39 : 3,587,726
68 : 3,587,727
89 : 3,587,728
94 : 3,587,729
110 : 3,587,730
140 : 3,587,731
158 : 3,587,732
166– .5 : 3,587,733
3,587,734
129 : 3,587,735
187 : 3,587,736
252 : 3,587,737
259 : 3,587,738
261 : 3,587,739
278 : 3,587,740
3,587,741
295 : 3,587,742
299 : 3,587,743
3,587,744
301 : 3,587,748
169– 15 : 3,587,745
19 : 3,587,746
26 : 3,587,747
172– 15 : 3,587,749
130 : 3,587,750
264 : 3,587,751
173– 12 : 3,587,752
107 : 3,587,753
117 : 3,587,754
159 : 3,587,755

174– 15 : 3,588,312
28 : 3,588,313
45 : 3,588,314
50.64: 3,588,315
84 : 3,588,316
108 : 3,588,317
121 : 3,588,318
143 : 3,588,319
175– 61 : 3,587,756
94 : 3,587,757
177– 1 : 3,587,758
4 : 3,587,759
134 : 3,587,761
141 : 3,587,760
203 : 3,587,762
178– 2 : 3,588,320
5.2 : 3,588,321
3,588,322
.4 : 3,588,323
3,588,324
3,588,325
3,588,326
3,588,327
3,588,328
6 : 3,588,329
3,588,330
3,588,331
.6 : 3,588,332
3,588,333
3,588,334
3,588,335
.8 : 3,588,336
3,588,347
7.1 : 3,588,337
3,588,338
.5 : 3,588,341
.6 : 3,588,342
3,588,343
17 : 3,588,344
18 : 3,588,345
42 : 3,588,346
66 : 3,588,348
3,588,349
68 : 3,588,350
69.5 : 3,588,351
70 : 3,588,339
108 : 3,588,340
179– 1 : 3,588,352
3,588,353
3,588,354
3,588,355
3,588,356
3,588,358
3,588,359
3,588,360
.5 : 3,588,363
2 : 3,588,357
.5 : 3,588,361
5 : 3,588,362
15 : 3,588,364
3,588,365
3,588,366
18 : 3,588,367
3,588,368
3,588,369
27 : 3,588,370
41 : 3,588,371
82 : 3,588,372
84 : 3,588,373
3,588,374
100.2 : 3,588,375
3,588,376
3,588,377
3,588,378
3,588,379
3,588,380
110 : 3,588,381
3,588,382
119 : 3,588,383
156 : 3,588,384
167 : 3,588,387
170.2 : 3,588,385
175.21: 3,588,386
180– 14 : 3,587,763
64 : 3,587,764
66 : 3,587,765
3,587,766
79.2 : 3,587,767
3,587,768
98 : 3,587,769
117 : 3,587,770
120 : 3,587,771
121 : 3,587,772
124 : 3,587,773
181– .5 : 3,587,774
3,587,775
24 : 3,587,776
33 : 3,587,777
3,587,778
36 : 3,587,779
184– 6 : 3,587,780
.16: 3,587,781
7 : 3,587,782
11 : 3,587,783
187– 9 : 3,587,784
29 : 3,587,785

187– 29 : 3,587,786
188– 1 : 3,587,787
71.7 : 3,587,788
225.6 : 3,587,791
243 : 3,587,792
269 : 3,587,789
281 : 3,587,790
190– 16 : 3,587,793
43 : 3,587,794
44 : 3,587,795
191– 12 : 3,588,388
.2 : 3,588,389
192– 8 : 3,587,796
12 : 3,587,798
18 : 3,587,797
53 : 3,587,799
58 : 3,587,800
3,587,801
89 : 3,587,802
107 : 3,587,803
193– 43 : 3,587,804
194– 2 : 3,587,805
4 : 3,587,806
13 : 3,587,807
3,587,808
100 : 3,587,809
197– 6.7 : 3,587,810
114 : 3,587,811
133 : 3,587,812
162 : 3,587,813
198– 7 : 3,587,814
19 : 3,587,815
20 : 3,587,816
3,587,817
3,587,818
3,587,819
22 : 3,587,820
3,587,821
26 : 3,587,822
27 : 3,587,823
33 : 3,587,824
36 : 3,587,825
83 : 3,587,826
106 : 3,587,827
108 : 3,587,828
131 : 3,587,829
170 : 3,587,830
171 : 3,587,831
184 : 3,587,832
220 : 3,587,833
233 : 3,587,834
200– 1 : 3,588,390
6 : 3,588,391
11 : 3,588,392
3,588,393
18 : 3,588,394
38 : 3,588,396
44 : 3,588,397
50 : 3,588,398
51.1 : 3,588,399
61.45: 3,588,400
.48: 3,588,401
67 : 3,588,402
83 : 3,588,395
3,588,403
84 : 3,588,404
144 : 3,588,405
3,588,406
148 : 3,588,407
152 : 3,588,408
153 : 3,588,409
3,588,410
157 : 3,588,411
166 : 3,588,412
3,588,413
3,588,414
3,588,416
167 : 3,588,420
3,588,422
168 : 3,588,415
3,588,421
3,588,423
206– 1 : 3,587,835
8 : 3,587,836
45.14: 3,587,837
46 : 3,587,838
3,587,839
52 : 3,587,840
3,587,841
56 : 3,587,842
57 : 3,587,843
3,587,844
3,587,845
65 : 3,587,846
3,587,847
78 : 3,587,848
209– 73 : 3,587,849
3,587,850
74 : 3,587,851
3,587,852
80.5 : 3,587,853
102 : 3,587,854
111.5 : 3,587,855
.7 : 3,587,856
119 : 3,587,857
257 : 3,587,858

210– 66 : 3,587,859
73 : 3,587,860
277 : 3,587,861
330 : 3,587,862
404 : 3,587,863
211– 37 : 3,587,864
3,587,865
133 : 3,587,866
183 : 3,587,867
213– 1 : 3,587,868
8 : 3,587,869
15 : 3,587,870
38 : 3,587,871
214– 1 : 3,587,872
3,587,873
3,587,874
6 : 3,587,875
3,587,876
7 : 3,587,877
16.1 : 3,587,878
17 : 3,587,879
19 : 3,587,880
33 : 3,587,881
75 : 3,587,882
77 : 3,587,883
83.24: 3,587,884
84 : 3,587,885
141 : 3,587,886
145 : 3,587,887
146.5 : 3,587,888
152 : 3,587,889
3,587,890
309 : 3,587,891
313 : 3,587,892
620 : 3,587,893
622 : 3,587,894
623 : 3,587,895
215– 9 : 3,587,896
38 : 3,587,897
40 : 3,587,898
73 : 3,587,899
217– 12 : 3,587,900
16 : 3,587,901
3,587,902
48 : 3,587,903
219– 8.5 : 3,588,424
50 : 3,588,429
56 : 3,588,417
59 : 3,588,427
67 : 3,588,426
69 : 3,588,428
3,588,430
3,588,431
73 : 3,588,432
76 : 3,588,433
84 : 3,588,434
85 : 3,588,425
98 : 3,588,418
108 : 3,588,435
109 : 3,588,436
113 : 3,588,437
117 : 3,588,438
121 : 3,588,439
3,588,440
3,588,441
3,588,442
3,588,463
130 : 3,588,464
137 : 3,588,443
3,588,465
3,588,466
214 : 3,588,467
271 : 3,588,468
308 : 3,588,469
362 : 3,588,444
378 : 3,588,470
486 : 3,588,471
501 : 3,588,445
3,588,446
3,588,447
511 : 3,588,448
220– 3 : 3,587,904
3,587,905
.2 : 3,587,906
4 : 3,587,907
3,587,908
23.4 : 3,587,910
26 : 3,587,911
40 : 3,587,912
55 : 3,587,913
63 : 3,587,914
102 : 3,587,915
221– 11 : 3,587,916
93 : 3,587,909
96 : 3,587,917
3,587,918
171 : 3,587,920
174 : 3,587,921
194 : 3,587,919
203 : 3,587,922
224 : 3,587,923
251 : 3,587,924
266 : 3,587,925
222– 5 : 3,587,926
66 : 3,587,927
91 : 3,587,928

222–129 : 3,587,929
146 : 3,587,930
176 : 3,587,931
178 : 3,587,932
3,587,933
181 : 3,587,934
195 : 3,587,935
196 : 3,587,936
213 : 3,587,937
228 : 3,587,938
333 : 3,587,939
383 : 3,587,940
402.17: 3,587,941
.24: 3,587,942
455 : 3,587,943
480 : 3,587,944
481 : 3,587,945
223– 46 : 3,587,946
49 : 3,587,947
84 : 3,587,948
93 : 3,587,949
224– 5 : 3,587,951
6 : 3,587,952
225– 2 : 3,587,953
93 : 3,587,954
.5 : 3,587,956
103 : 3,587,955
104 : 3,587,957
226– 17 : 3,587,958
43 : 3,587,959
62 : 3,587,960
90 : 3,587,961
95 : 3,587,962
235– 61.11: 3,588,451
3,588,452
3,588,453
3,588,454
.12: 3,588,455
3,588,456
3,588,457
.7 : 3,588,449
.8 : 3,588,450
92 : 3,588,458
3,588,459
3,588,461
3,588,462
3,588,472
3,588,473
3,588,474
3,588,475
117 : 3,588,476
150.22: 3,588,477
.27: 3,588,478
.52: 3,588,479
151.3 : 3,588,480
.34: 3,588,481
153 : 3,588,484
155 : 3,588,482
156 : 3,588,460
175 : 3,588,483
186 : 3,588,485
194 : 3,588,486
197 : 3,588,487
236– 92 : 3,587,963
238– 2 : 3,587,964
349 : 3,587,965
239– 2 : 3,587,966
15 : 3,587,967
47 : 3,587,968
76 : 3,587,969
126 : 3,587,970
155 : 3,587,971
212 : 3,587,972
265.13: 3,587,973
423 : 3,587,974
428.5 : 3,587,975
3,587,976
533 : 3,587,977
550 : 3,587,978
569 : 3,587,979
240– 1.4 : 3,588,488
2 : 3,588,489
6.4 : 3,588,490
3,588,491
41.1 : 3,588,492
.37: 3,588,493
241– 19 : 3,587,980
29 : 3,587,981
62 : 3,587,982
64 : 3,587,983
99 : 3,587,984
138 : 3,587,985
231 : 3,587,986
294 : 3,587,987
242– 4 : 3,587,988
18 : 3,587,989
35.6 : 3,587,990
55.16: 3,587,991
78.1 : 3,587,992
80 : 3,587,993
84.2 : 3,587,995
158.3 : 3,587,994
176 : 3,587,996
201 : 3,587,997
206 : 3,587,998
244– 1 : 3,587,999

244– 1 : 3,588,000
3,588,001
3.14: 3,588,002
.22: 3,588,003
.27: 3,588,004
41 : 3,588,005
62 : 3,588,006
77 : 3,588,007
245– 85 : 3,588,046
246– 63 : 3,588,494
248– 15 : 3,588,008
23 : 3,588,009
54 : 3,588,010
68 : 3,588,011
80 : 3,588,012
158 : 3,588,013
180 : 3,588,014
188.1 : 3,588,015
204 : 3,588,016
205 : 3,588,017
223 : 3,588,018
225 : 3,588,020
228 : 3,588,019
317 : 3,588,021
360 : 3,588,022
410 : 3,588,023
451 : 3,588,024
481 : 3,588,025
249– 10 : 3,588,026
48 : 3,588,027
116 : 3,588,028
127 : 3,588,029
250– 41.9 : 3,588,495
43.5 : 3,588,496
3,588,497
54 : 3,588,498
55 : 3,588,499
3,588,500
65 : 3,588,030
3,588,501
3,588,502
3,588,503
71.5 : 3,588,504
83.1 : 3,588,505
.3 : 3,588,506
3,588,507
3,588,508
84.5 : 3,588,509
103 : 3,588,510
105 : 3,588,511
106 : 3,588,031
214 : 3,588,512
219 : 3,588,513
227 : 3,588,514
231 : 3,588,515
3,588,516
233 : 3,588,517
251– 3 : 3,588,032
3,588,033
8 : 3,588,034
61 : 3,588,035
3,588,036
127 : 3,588,037
129 : 3,588,038
141 : 3,588,039
244 : 3,588,040
263 : 3,588,041
315 : 3,588,042
254– 18 : 3,588,043
29 : 3,588,044
3,588,045
93 : 3,588,047
94 : 3,588,048
147 : 3,588,049
173 : 3,588,050
190 : 3,588,051
259– 3 : 3,588,052
4 : 3,588,053
3,588,054
64 : 3,588,055
178 : 3,588,056
261– 39 : 3,588,057
67 : 3,588,058
263– 6 : 3,588,059
28 : 3,588,060
32 : 3,588,061
40 : 3,588,062
53 : 3,588,063
266– 5 : 3,588,065
23 : 3,588,066
25 : 3,588,067
31 : 3,588,068
34 : 3,588,069
3,588,070
3,588,071
36 : 3,588,072
39 : 3,588,073
267– 64 : 3,588,064
73 : 3,588,074
121 : 3,588,075
127 : 3,588,076
176 : 3,588,077
269– 6 : 3,588,078
21 : 3,588,079
25 : 3,588,080
40 : 3,588,081

269— 49 : 3.588.082
98 : 3.588.083
3.588.084
270— 37 : 3.588.085
58 : 3.588.086
3.588.087
79 : 3.588.088
93 : 3.588.089
271— 1 : 3.588.090
19 : 3.588.091
3.588.092
32 : 3.588.093
36 : 3.588.094
44 : 3.588.095
58 : 3.588.096
61 : 3.588.097
3.588.106
272— 1 : 3.588.098
8 : 3.588.099
30 : 3.588.100
81 : 3.588.101
3.588.102
273— 1.5 : 3.588.103
26 : 3.588.104
32 : 3.588.105
86 : 3.588.107
101.1 : 3.588.108
109 : 3.588.109
119 : 3.588.110
3.588.111
130 : 3.588.112
3.588.113
131 : 3.588.114
135 : 3.588.115
149 : 3.588.116
176 : 3.588.117
274— 1 : 3.588.118
4 : 3.588.119
10 : 3.588.120
3.588.121
39 : 3.588.122
47 : 3.588.123
277— 3 : 3.588.124
26 : 3.588.125
32 : 3.588.126
92 : 3.588.127
93 : 3.588.128
95 : 3.588.129
116.8 : 3.588.130
206 : 3.588.131
207 : 3.588.132
235 : 3.588.133
3.588.134
279— 83 : 3.588.135
280— 5 : 3.588.136
3.588.137
16 : 3.588.138
43.22: 3.588.139
124 : 3.588.141
150 : 3.588.140
3.588.142
3.588.143
236 : 3.588.144
406 : 3.588.145
478 : 3.588.146
481 : 3.588.147
285— 8 : 3.588.148
110 : 3.588.149
381 : 3.588.150
287— 1 : 3.588.151
52.03: 3.588.152
78 : 3.588.153
108 : 3.588.154
291— 1 : 3.588.155
292—113 : 3.588.156
322 : 3.588.157
293— 1 : 3.588.158
3.588.159
73 : 3.588.160
294— 19 : 3.588.161
67 : 3.588.163
74 : 3.588.164
86.29: 3.588.162
.3 : 3.588.165
296— 24 : 3.588.166
27 : 3.588.167
28 : 3.588.168
95 : 3.588.169
297— 69 : 3.588.170
195 : 3.588.171
355 : 3.588.172
386 : 3.588.173
299— 8 : 3.588.174
11 : 3.588.175
302— 2 : 3.588.176
14 : 3.588.177
28 : 3.588.178
37 : 3.588.179
50 : 3.588.180
52 : 3.588.181
56 : 3.588.182
66 : 3.588.183
303— 20 : 3.588.184
3.588.185

303— 20 : 3.588.186
21 : 3.588.187
3.588.188
3.588.189
3.588.190
3.588.191
3.588.192
3.588.193
23 : 3.588.194
305— 57 : 3.588.195
307— 38 : 3.588.518
87 : 3.588.519
112 : 3.588.520
118 : 3.588.521
125 : 3.588.522
132 : 3.588.523
141 : 3.588.524
202 : 3.588.525
221 : 3.588.526
3.588.527
3.588.528
229 : 3.588.529
3.588.530
3.588.531
233 : 3.588.532
3.588.533
3.588.534
235 : 3.588.535
3.588.536
3.588.537
246 : 3.588.538
3.588.539
251 : 3.588.540
252 : 3.588.541
3.588.542
265 : 3.588.543
268 : 3.588.544
289 : 3.588.545
291 : 3.588.546
293 : 3.588.547
295 : 3.588.548
309 : 3.588.549
313 : 3.588.550
308— 3.8 : 3.588.198
4 : 3.588.199
5 : 3.588.196
6 : 3.588.200
9 : 3.588.197
36.1 : 3.588.201
122 : 3.588.202
160 : 3.588.203
184 : 3.588.204
3.588.205
187.1 : 3.588.206
201 : 3.588.207
236 : 3.588.208
310— 8.1 : 3.588.551
.7 : 3.588.552
3.588.553
9.5 : 3.588.554
13 : 3.588.555
58 : 3.588.556
60 : 3.588.557
95 : 3.588.558
168 : 3.588.559
214 : 3.588.560
216 : 3.588.561
232 : 3.588.562
312—140.2 : 3.588.209
194 : 3.588.211
196 : 3.588.210
204 : 3.588.212
214 : 3.588.213
3.588.214
313— 7 : 3.588.563
43 : 3.588.564
74 : 3.588.565
76 : 3.588.566
85 : 3.588.567
3.588.568
3.588.569
94 : 3.588.570
109.5 : 3.588.571
146 : 3.588.572
221 : 3.588.573
237 : 3.588.574
238 : 3.588.575
306 : 3.588.576
317 : 3.588.577
325 : 3.588.578
344 : 3.588.579
314—130 : 3.588.580
3.588.581
315— 5.35: 3.588.582
8 : 3.588.583
10 : 3.588.584
13 : 3.588.585
18 : 3.588.586
21 : 3.588.587
39.53: 3.588.588
3.588.589
57 : 3.588.590
77 : 3.588.591
99 : 3.588.592

315—108 : 3.588.593
111 : 3.588.594
127 : 3.588.595
169 : 3.588.596
3.588.597
199 : 3.588.598
200 : 3.588.599
326 : 3.588.600
344 : 3.588.601
316— 7 : 3.588.602
317— 9 : 3.588.603
11 : 3.588.604
3.588.605
15 : 3.588.606
3.588.607
28 : 3.588.610
31 : 3.588.608
3.588.609
3.588.611
33 : 3.588.612
3.588.613
41 : 3.588.614
101 : 3.588.615
3.588.616
3.588.617
3.588.618
119 : 3.588.619
3.588.620
134 : 3.587.950
142 : 3.588.621
148.5 : 3.588.622
157.5 : 3.588.623
3.588.624
230 : 3.588.625
3.588.626
3.588.627
3.588.628
3.588.629
3.588.630
3.588.631
234 : 3.588.632
3.588.633
3.588.634
235 : 3.588.635
238 : 3.588.636
3.588.637
3.588.638
3.588.639
249 : 3.588.640
3.588.641
3.588.642
258 : 3.588.643
259 : 3.588.644
318—142 : 3.588.645
163 : 3.588.419
221 : 3.588.646
224 : 3.588.649
227 : 3.588.647
3.588.648
3.588.650
266 : 3.588.651
282 : 3.588.652
3.588.656
331 : 3.588.653
3.588.654
345 : 3.588.655
471 : 3.588.657
563 : 3.588.658
608 : 3.588.659
658 : 3.588.660
696 : 3.588.661
3.588.662
320— 39 : 3.588.663
321— 2 : 3.588.664
3.588.665
3.588.666
5 : 3.588.667
3.588.668
45 : 3.588.669
3.588.670
47 : 3.588.671
323— 4 : 3.588.672
9 : 3.588.673
19 : 3.588.674
22 : 3.588.675
324— .5 : 3.588.676
3.588.677
3.588.678
17 : 3.588.679
28 : 3.588.680
34 : 3.588.681
37 : 3.588.682
3.588.683
38 : 3.588.684
41 : 3.588.685
3.588.686
3.588.687
51 : 3.588.688
52 : 3.588.689
56 : 3.588.690
57 : 3.588.691
60 : 3.588.692
85 : 3.588.694
111 : 3.588.695

324—121 : 3.588.696
158 : 3.588.697
169 : 3.588.698
189 : 3.588.699
778 : 3.588.693
325— 2 : 3.588.700
15 : 3.588.701
38 : 3.588.702
58 : 3.588.703
105 : 3.588.704
348 : 3.588.705
417 : 3.588.706
328— 55 : 3.588.707
58 : 3.588.708
63 : 3.588.709
133 : 3.588.710
140 : 3.588.711
150 : 3.588.712
160 : 3.588.713
164 : 3.588.714
3.588.715
167 : 3.588.716
229 : 3.588.717
329—104 : 3.588.718
105 : 3.588.719
124 : 3.588.720
129 : 3.588.721
204 : 3.588.722
3.588.723
330— 10 : 3.588.724
21 : 3.588.725
29 : 3.588.726
34 : 3.588.727
69 : 3.588.728
207 : 3.588.729
331— 2 : 3.588.730
3.588.731
3.588.732
3.588.733
12 : 3.588.734
47 : 3.588.735
3.588.736
94.5 : 3.588.737
3.588.738
3.588.739
3.588.740
96 : 3.588.741
3.588.742
108 : 3.588.743
332— 9 : 3.588.744
3.588.745
14 : 3.588.746
26 : 3.588.747
44 : 3.588.748
51 : 3.588.749
302 : 3.588.750
333— 6 : 3.588.751
17 : 3.588.752
21 : 3.588.753
3.588.754
30 : 3.588.755
72 : 3.588.756
73 : 3.588.757
79 : 3.588.758
84 : 3.588.759
95 : 3.588.760
335— 16 : 3.588.761
3.588.762
3.588.763
154 : 3.588.764
203 : 3.588.765
207 : 3.588.766
209 : 3.588.767
225 : 3.588.768
230 : 3.588.769
255 : 3.588.770
284 : 3.588.771
337— 8 : 3.588.772
30 : 3.588.773
100 : 3.588.774
226 : 3.588.775
415 : 3.588.776
338— 32 : 3.588.777
172 : 3.588.778
183 : 3.588.779
196 : 3.588.780
339— 12 : 3.588.781
14 : 3.588.782
59 : 3.588.783
64 : 3.588.785
65 : 3.588.784
75 : 3.588.786
95 : 3.588.787
98 : 3.588.788
217 : 3.588.789
230 : 3.588.790
247 : 3.588.791
258 : 3.588.862
263 : 3.588.792
276 : 3.588.793
340— 3 : 3.588.794
3.588.795
6 : 3.588.796
3.588.797

340— 6 : 3.588.798
3.588.799
12 : 3.588.801
15.5 : 3.588.800
3.588.802
16 : 3.588.803
18 : 3.588.804
31 : 3.588.805
38 : 3.588.806
40 : 3.588.807
41 : 3.588.808
52 : 3.588.809
3.588.810
3.588.811
55 : 3.588.812
58 : 3.588.813
3.588.814
3.588.815
80 : 3.588.816
87 : 3.588.817
146.1 : 3.588.819
3.588.820
.3 : 3.588.818
3.588.821
3.588.822
3.588.823
149 : 3.588.889
163 : 3.588.824
3.588.825
166 : 3.588.826
3.588.827
169 : 3.588.828
172.5 : 3.588.829
3.588.830
3.588.831
3.588.832
3.588.833
3.588.834
3.588.835
3.588.837
3.588.838
3.588.839
3.588.840
3.588.841
3.588.842
3.588.843
173 : 3.588.844
3.588.845
3.588.846
3.588.847
3.588.848
174 : 3.588.849
3.588.850
3.588.851
3.588.852
3.588.853
3.588.854
.1 : 3.588.836
3.588.855
181 : 3.588.856
213 : 3.588.857
224 : 3.588.858
244 : 3.588.859
248 : 3.588.860
252 : 3.588.861
259 : 3.588.863
267 : 3.588.864
276 : 3.588.865
3.588.866
282 : 3.588.867
286 : 3.588.868
323 : 3.588.869
324 : 3.588.870
3.588.871
3.588.872
3.588.873
3.588.874
347 : 3.588.875
3.588.876
3.588.877
3.588.878
3.588.879
3.588.880
3.588.881
3.588.882
3.588.883
3.588.884
3.588.885
3.588.886
3.588.887
378 : 3.588.888
409 : 3.588.890
3.588.891
410 : 3.588.892
418 : 3.588.893
343— 5 : 3.588.894
3.588.895
3.588.896
6 : 3.588.897
7.7 : 3.588.898
14 : 3.588.899
117 : 3.588.900
741 : 3.588.901
745 : 3.588.902

343—792 : 3.588.903
.5 : 3.588.904
856 : 3.588.905
346— 1 : 3.588.906
3.588.907
33 : 3.588.908
3.588.909
62 : 3.588.910
74 : 3.588.911
76 : 3.588.912
350— 1 : 3.588.215
3.588.216
3.5 : 3.588.217
7 : 3.588.218
14 : 3.588.219
55 : 3.588.220
96 : 3.588.221
100 : 3.588.222
151 : 3.588.223
157 : 3.588.224
160 : 3.588.225
183 : 3.588.226
194 : 3.588.227
215 : 3.588.228
221 : 3.588.229
252 : 3.588.230
279 : 3.588.231
288 : 3.588.232
292 : 3.588.233
351— 13 : 3.588.234
19 : 3.588.235
158 : 3.588.236
352— 39 : 3.588.237
159 : 3.588.238
243 : 3.588.239
353— 85 : 3.588.240
94 : 3.588.241
355— 8 : 3.588.244
16 : 3.588.242
38 : 3.588.246
40 : 3.588.243
69 : 3.588.247
71 : 3.588.245
74 : 3.588.248
356— 4 : 3.588.249
8 : 3.588.250
74 : 3.588.251
82 : 3.588.252
93 : 3.588.253
106 : 3.588.254
153 : 3.588.255
164 : 3.588.256
187 : 3.588.257
240 : 3.588.258
244 : 3.588.259
401— 49 : 3.588.260
59 : 3.588.262
92 : 3.588.261
125 : 3.588.263
197 : 3.588.264
408— 11 : 3.587.360
16 : 3.587.361
115 : 3.587.362
124 : 3.587.359
415— 1 : 3.588.265
11 : 3.588.266
135 : 3.588.267
145 : 3.588.268
161 : 3.588.269
162 : 3.588.270
174 : 3.588.271
416— 1 : 3.588.272
42 : 3.588.273
63 : 3.588.274
71 : 3.588.275
95 : 3.588.276
96 : 3.588.277
190 : 3.588.278
191 : 3.588.279
200 : 3.588.280
417— 53 : 3.588.281
65 : 3.588.282
68 : 3.588.283
201 : 3.588.284
202 : 3.588.285
218 : 3.588.286
234 : 3.588.288
275 : 3.588.287
294 : 3.588.289
370 : 3.588.290
417 : 3.588.291
446 : 3.588.292
479 : 3.588.293
532 : 3.588.294
418— 21 : 3.588.295
83 : 3.588.296
212 : 3.588.297
431— 1 : 3.588.298
78 : 3.588.299
93 : 3.588.300
254 : 3.588.302
343 : 3.588.303
348 : 3.588.301
353 : 3.588.304

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 3,587,684
3,588,003
3,588,253
3,588,530
4 : 3,587,217
3,587,934
3,588,019
3,588,146
3,588,180
3,588,304
3,588,740
5 : 3,587,228
3,587,391
6 : 3,587,115
3,587,117
3,587,127
3,587,140
3,587,164
3,587,167
3,587,172
3,587,184
3,587,185
3,587,186
3,587,190
3,587,194
3,587,213
3,587,216
3,587,231
3,587,234
3,587,236
3,587,247
3,587,260
3,587,271
3,587,291
3,587,301
3,587,310
3,587,313
3,587,321
3,587,349
3,587,367
3,587,371
3,587,393
3,587,397
3,587,398
3,587,411
3,587,418
3,587,440
3,587,443
3,587,453
3,587,455

6 : 3,587,457
3,587,463
3,587,470
3,587,481
3,587,558
3,587,562
3,587,580
3,587,581
3,587,582
3,587,588
3,587,590
3,587,601
3,587,605
3,587,613
3,587,618
3,587,621
3,587,622
3,587,632
3,587,637
3,587,653
3,587,659
3,587,675
3,587,678
3,587,688
3,587,696
3,587,699
3,587,725
3,587,733
3,587,734
3,587,763
3,587,767
3,587,777
3,587,778
3,587,779
3,587,787
3,587,802
3,587,810
3,587,814
3,587,857
3,587,872
3,587,884
3,587,896
3,587,904
3,587,924
3,587,931
3,587,941
3,587,946
3,587,948
3,587,957
3,587,969

6 : 3,587,972
3,587,976
3,587,986
3,588,017
3,588,031
3,588,033
3,588,034
3,588,040
3,588,045
3,588,074
3,588,076
3,588,078
3,588,082
3,588,086
3,588,098
3,588,099
3,588,110
3,588,111
3,588,113
3,588,115
3,588,148
3,588,150
3,588,158
3,588,159
3,588,161
3,588,166
3,588,172
3,588,173
3,588,174
3,588,197
3,588,199
3,588,207
3,588,209
3,588,218
3,588,257
3,588,275
3,588,278
3,588,297
3,588,325
3,588,326
3,588,340
3,588,375
3,588,379
3,588,397
3,588,409
3,588,410
3,588,420
3,588,423
3,588,440
3,588,450

6 : 3,588,454
3,588,465
3,588,471
3,588,485
3,588,486
3,588,489
3,588,508
3,588,511
3,588,559
3,588,576
3,588,593
3,588,595
3,588,618
3,588,633
3,588,650
3,588,671
3,588,673
3,588,681
3,588,693
3,588,703
3,588,708
3,588,716
3,588,722
3,588,723
3,588,728
3,588,733
3,588,737
3,588,738
3,588,752
3,588,753
3,588,756
3,588,758
3,588,781
3,588,782
3,588,798
3,588,812
3,588,818
3,588,831
3,588,841
3,588,845
3,588,847
3,588,854
3,588,873
3,588,882
3,588,893
3,588,894
3,588,904
8 : 3,587,295
3,587,737
3,587,747

8 : 3,587,780
3,587,876
3,587,883
3,587,951
3,588,377
3,588,558
3,588,855
3,588,912
9 : 3,587,152
3,587,154
3,587,175
3,587,262
3,587,279
3,587,344
3,587,387
3,587,444
3,587,487
3,587,535
3,587,596
3,587,643
3,587,644
3,587,648
3,587,668
3,587,732
3,587,862
3,587,887
3,587,906
3,588,039
3,588,046
3,588,081
3,588,087
3,588,089
3,588,208
3,588,219
3,588,221
3,588,283
3,588,322
3,588,426
3,588,444
3,588,463
3,588,467
3,588,476
3,588,523
3,588,547
3,588,620
3,588,761
3,588,762
3,588,763
3,588,776
3,588,796

9 : 3,588,807
3,588,865
10 : 3,587,145
3,587,189
3,588,255
3,588,314
3,588,503
11 : 3,587,424
3,587,978
3,588,220
3,588,230
3,588,452
3,588,648
3,588,687
3,588,705
3,588,751
3,588,883
12 : 3,587,141
3,587,363
3,587,437
3,587,506
3,587,508
3,587,520
3,587,546
3,587,560
3,587,570
3,587,585
3,587,836
3,587,989
3,588,023
3,588,053
3,588,210
3,588,215
3,588,359
3,588,512
3,588,517
3,588,538
3,588,795
3,588,806
3,588,869
13 : 3,588,104
15 : 3,587,225
16 : 3,587,854
3,588,374
3,588,859
17 : 3,587,135
3,587,155
3,587,158
3,587,173
3,587,198

18 : 3,589,230
3,589,280
3,589,392
3,589,529
3,589,570
3,589,707
3,589,748
3,589,825
3,589,888
3,589,919
3,589,953
3,589,997
3,590,027
3,590,051
3,590,120
3,590,132
3,590,154
3,590,156
3,590,170
3,590,293
3,590,318
3,590,329
19 : 3,589,110
3,589,360
3,589,447
3,589,448
3,589,470
3,589,504
3,589,522
3,589,556
3,589,559
3,589,624
3,589,892
3,590,116
3,590,215
20 : 3,588,949
3,589,304
3,589,614
3,590,237
21 : Re.27,151
3,589,222
3,589,269
3,589,493
3,590,127
3,590,200
3,590,310
22 : 3,589,482
3,589,822
23 : 3,589,033
24 : 3,588,917
3,588,958
3,589,052
3,589,059
3,589,089
3,589,134
3,589,294
3,589,359
3,589,613
3,589,632
3,589,664
3,589,755
3,589,758
3,589,856
3,590,060
3,590,126
3,590,182
3,590,272
3,590,280
3,590,285
3,590,315
3,590,345
3,590,377
25 : 3,588,933
3,588,983
3,588,988
3,588,998
3,589,078
3,589,187
3,589,235
3,589,253
3,589,254
3,589,262
3,589,334
3,589,590
3,589,595
3,589,603
3,589,606
3,589,630
3,589,831
3,589,843
3,589,904
3,589,942
3,589,961
3,589,965
3,589,996
3,589,999
3,590,101
3,590,184
3,590,185
3,590,186
3,590,197
3,590,248
3,590,255
3,590,337
3,590,358
26 : 3,588,925

26 : 3,588,946
3,588,959
3,588,960
3,588,969
3,588,976
3,588,977
3,589,017
3,589,075
3,589,108
3,589,177
3,589,197
3,589,203
3,589,206
3,589,210
3,589,236
3,589,245
3,589,265
3,589,277
3,589,306
3,589,308
3,589,318
3,589,326
3,589,349
3,589,395
3,589,403
3,589,418
3,589,476
3,589,532
3,589,548
3,589,550
3,589,557
3,589,588
3,589,592
3,589,602
3,589,640
3,589,732
3,589,761
3,589,762
3,589,767
3,589,786
3,589,793
3,589,818
3,589,826
3,589,833
3,589,863
3,589,877
3,589,889
3,589,890
3,589,917
3,589,920
3,589,950
3,589,954
3,589,958
3,589,972
3,590,020
3,590,064
3,590,065
3,590,141
3,590,201
3,590,204
3,590,205
3,590,206
3,590,210
3,590,221
3,590,225
3,590,317
3,590,323
27 : 3,588,943
3,588,945
3,588,950
3,588,990
3,589,049
3,589,096
3,589,116
3,589,198
3,589,201
3,589,224
3,589,292
3,589,378
3,589,396
3,589,467
3,589,500
3,589,512
3,589,564
3,589,565
3,589,653
3,589,734
3,589,778
3,589,901
3,589,903
3,589,932
3,589,941
3,590,125
3,590,135
3,590,261
28 : 3,589,661
29 : 3,589,155
3,589,268
3,589,305
3,589,323
3,589,350
3,589,379
3,589,427
3,589,492
3,589,505
3,589,554

29 : 3,589,627
3,589,673
3,589,688
3,589,708
3,589,754
3,590,076
3,590,121
3,590,217
3,590,218
3,590,219
31 : 3,589,266
3,589,419
3,589,533
3,590,173
32 : 3,589,057
3,589,785
3,589,802
3,589,987
3,589,995
33 : 3,589,084
3,589,416
3,589,571
3,590,115
3,590,309
3,590,360
34 : 3,588,926
3,588,963
3,588,966
3,588,993
3,588,997
3,589,023
3,589,045
3,589,066
3,589,102
3,589,173
3,589,196
3,589,216
3,589,261
3,589,287
3,589,295
3,589,310
3,589,336
3,589,338
3,589,362
3,589,372
3,589,402
3,589,406
3,589,454
3,589,473
3,589,487
3,589,511
3,589,587
3,589,593
3,589,607
3,589,623
3,589,652
3,589,722
3,589,769
3,589,790
3,589,794
3,589,797
3,589,814
3,589,847
3,589,852
3,589,857
3,589,859
3,589,860
3,589,881
3,589,895
3,589,899
3,589,900
3,589,912
3,589,924
3,589,960
3,589,976
3,589,983
3,589,994
3,590,005
3,590,006
3,590,018
3,590,019
3,590,031
3,590,044
3,590,047
3,590,049
3,590,050
3,590,053
3,590,079
3,590,082
3,590,100
3,590,112
3,590,122
3,590,131
3,590,177
3,590,223
3,590,263
3,590,266
3,590,267
3,590,268
3,590,271
3,590,275
3,590,283
3,590,305
3,590,308
3,590,313
3,590,324

34 : 3,590,331
3,590,341
3,590,361
3,590,362
3,590,387
36 : 3,588,920
3,588,929
3,588,961
3,588,962
3,588,968
3,588,985
3,589,003
3,589,030
3,589,054
3,589,060
3,589,062
3,589,063
3,589,071
3,589,072
3,589,080
3,589,081
3,589,085
3,589,098
3,589,100
3,589,126
3,589,140
3,589,141
3,589,156
3,589,158
3,589,184
3,589,195
3,589,219
3,589,251
3,589,255
3,589,256
3,589,263
3,589,264
3,589,281
3,589,282
3,589,289
3,589,293
3,589,329
3,589,363
3,589,368
3,589,373
3,589,400
3,589,410
3,589,413
3,589,430
3,589,445
3,589,455
3,589,496
3,589,497
3,589,499
3,589,503
3,589,508
3,589,544
3,589,545
3,589,572
3,589,575
3,589,605
3,589,618
3,589,636
3,589,638
3,589,665
3,589,698
3,589,704
3,589,736
3,589,744
3,589,772
3,589,789
3,589,800
3,589,801
3,589,805
3,589,807
3,589,808
3,589,809
3,589,820
3,589,848
3,589,849
3,589,870
3,589,880
3,589,896
3,589,897
3,589,905
3,589,908
3,589,911
3,589,914
3,589,916
3,589,921
3,589,926
3,589,936
3,589,943
3,589,945
3,589,969
3,589,973
3,589,989
3,590,000
3,590,036
3,590,038
3,590,040
3,590,061
3,590,083
3,590,089
3,590,107
3,590,133

36 : 3,590,137
3,590,150
3,590,152
3,590,155
3,590,159
3,590,160
3,590,176
3,590,232
3,590,240
3,590,242
3,590,250
3,590,251
3,590,253
3,590,327
3,590,349
3,590,350
3,590,365
3,590,372
37 : 3,589,284
3,589,309
3,589,357
3,589,408
3,590,022
3,590,174
3,590,376
39 : Re.27,150
3,588,957
3,588,965
3,588,980
3,588,996
3,589,001
3,589,009
3,589,048
3,589,077
3,589,117
3,589,127
3,589,136
3,589,139
3,589,148
3,589,151
3,589,159
3,589,161
3,589,163
3,589,166
3,589,170
3,589,182
3,589,192
3,589,225
3,589,226
3,589,231
3,589,238
3,589,243
3,589,279
3,589,285
3,589,286
3,589,288
3,589,290
3,589,330
3,589,375
3,589,387
3,589,393
3,589,432
3,589,446
3,589,475
3,589,478
3,589,479
3,589,483
3,589,510
3,589,530
3,589,552
3,589,553
3,589,560
3,589,574
3,589,577
3,589,617
3,589,626
3,589,629
3,589,654
3,589,655
3,589,670
3,589,679
3,589,691
3,589,746
3,589,760
3,589,781
3,589,815
3,589,819
3,589,836
3,589,841
3,589,845
3,589,846
3,589,875
3,589,876
3,589,882
3,589,885
3,589,974
3,589,986
3,590,008
3,590,015
3,590,035
3,590,058
3,590,085
3,590,114
3,590,117
3,590,118
3,590,119

39 : 3,590,149
3,590,165
3,590,171
3,590,172
3,590,183
3,590,196
3,590,238
3,590,287
3,590,288
3,590,334
3,590,385
40 : 3,588,952
3,589,133
3,589,153
3,589,312
3,589,356
3,589,443
3,589,514
3,589,523
3,589,527
3,589,528
3,589,576
3,589,616
3,589,675
3,589,678
3,589,984
3,590,066
3,590,093
3,590,094
3,590,095
3,590,096
3,590,097
3,590,099
3,590,167
3,590,236
3,590,243
41 : 3,588,913
3,589,315
3,589,415
3,589,537
3,589,609
3,589,765
42 : 3,588,922
3,588,938
3,588,956
3,588,964
3,588,982
3,588,987
3,589,000
3,589,020
3,589,065
3,589,093
3,589,105
3,589,160
3,589,168
3,589,172
3,589,176
3,589,185
3,589,189
3,589,199
3,589,213
3,589,237
3,589,301
3,589,303
3,589,316
3,589,321
3,589,331
3,589,341
3,589,346
3,589,351
3,589,364
3,589,365
3,589,382
3,589,386
3,589,436
3,589,468
3,589,474
3,589,612
3,589,647
3,589,681
3,589,692
3,589,699
3,589,726
3,589,782
3,589,850
3,589,858
3,589,861
3,589,883
3,589,887
3,589,906
3,589,913
3,589,915
3,589,934
3,589,938
3,589,940
3,589,946
3,589,964
3,589,979
3,590,001
3,590,045
3,590,069
3,590,073
3,590,091
3,590,178
3,590,187
3,590,188

36 : 3,588,823
3,588,824
3,588,825
3,588,826
3,588,829
3,588,830
3,588,833
3,588,836
3,588,838
3,588,839
3,588,846
3,588,853
3,588,871
3,588,902
37 : 3,587,389
3,587,516
3,587,796
3,587,903
3,588,388
3,588,443
3,588,446
3,588,447
3,588,624
3,588,778
3,588,832
38 : 3,587,239
3,587,482
3,587,938
3,588,100
3,588,248
39 : 3,587,124
3,587,144
3,587,157
3,587,163
3,587,201
3,587,244
3,587,245
3,587,272
3,587,317
3,587,324
3,587,359
3,587,406
3,587,413
3,587,445
3,587,476
3,587,525
3,587,538
3,587,602
3,587,635
3,587,689
3,587,701
3,587,709
3,587,711
3,587,714
3,587,720
3,587,753
3,587,756
3,587,759
3,587,784

39 : 3,587,788
3,587,790
3,587,798
3,587,801
3,587,805
3,587,815
3,587,822
3,587,828
3,587,846
3,587,861
3,587,866
3,587,880
3,587,895
3,587,898
3,587,922
3,587,940
3,587,956
3,587,958
3,587,973
3,587,982
3,587,993
3,588,009
3,588,037
3,588,062
3,588,073
3,588,090
3,588,120
3,588,125
3,588,249
3,588,260
3,588,268
3,588,277
3,588,315
3,588,316
3,588,395
3,588,424
3,588,464
3,588,493
3,588,519
3,588,577
3,588,597
3,588,680
3,588,695
3,588,783
3,588,835
3,588,870
3,588,872
3,588,895
3,588,903
3,588,906
40 : 3,587,130
3,587,382
3,587,511
3,587,726
3,587,731
3,587,738
3,587,739
3,587,743
3,587,774

40 : 3,587,995
3,588,800
3,588,860
3,588,885
41 : 3,587,121
3,587,285
3,587,330
3,587,629
3,587,686
3,587,979
3,588,670
3,588,672
3,588,814
3,588,886
42 : 3,587,132
3,587,169
3,587,188
3,587,199
3,587,209
3,587,266
3,587,268
3,587,276
3,587,289
3,587,293
3,587,303
3,587,337
3,587,386
3,587,502
3,587,524
3,587,556
3,587,561
3,587,567
3,587,633
3,587,652
3,587,654
3,587,658
3,587,705
3,587,716
3,587,728
3,587,855
3,587,886
3,587,897
3,587,908
3,587,911
3,587,936
3,587,945
3,587,966
3,588,024
3,588,030
3,588,065
3,588,066
3,588,112
3,588,137
3,588,149
3,588,184
3,588,185
3,588,186
3,588,201
3,588,225

42 : 3,588,279
3,588,347
3,588,398
3,588,405
3,588,407
3,588,433
3,588,448
3,588,449
3,588,518
3,588,520
3,588,533
3,588,536
3,588,543
3,588,557
3,588,568
3,588,570
3,588,573
3,588,606
3,588,607
3,588,665
3,588,688
3,588,689
3,588,699
3,588,709
3,588,769
3,588,772
3,588,784
3,588,858
43 : 3,587,119
3,588,015
44 : 3,587,226
3,588,202
45 : 3,587,656
3,587,843
3,587,844
3,587,845
3,588,091
3,588,103
3,588,684
47 : 3,587,273
3,587,578
3,587,680
3,587,808
3,587,850
3,588,171
3,588,656
3,588,729
48 : 3,587,166
3,587,241
3,587,290
3,587,331
3,587,405
3,587,448
3,587,450
3,587,496
3,587,497
3,587,512
3,587,530
3,587,531

48 : 3,587,591
3,587,624
3,587,627
3,587,687
3,587,735
3,587,736
3,587,744
3,587,775
3,587,800
3,587,807
3,587,869
3,587,881
3,587,975
3,588,006
3,588,014
3,588,114
3,588,130
3,588,162
3,588,175
3,588,177
3,588,182
3,588,183
3,588,271
3,588,282
3,588,358
3,588,432
3,588,456
3,588,481
3,588,522
3,588,537
3,588,580
3,588,647
3,588,683
3,588,732
3,588,777
3,588,801
3,588,804
3,588,815
3,588,844
3,588,848
3,588,861
3,588,891
3,588,908
3,588,911
49 : 3,587,853
3,588,169
3,588,233
3,588,686
50 : 3,587,305
3,587,322
3,587,761
3,588,529
3,588,640
3,588,641
3,588,642
3,588,643
51 : 3,587,297
3,587,306
3,587,308
3,587,311

51 : 3,587,379
3,587,823
3,587,910
3,588,254
3,588,390
3,588,669
3,588,734
3,588,803
52 : 3,587,197
53 : 3,587,153
3,587,193
3,587,333
3,587,446
3,587,505
3,587,766
3,587,877
3,587,935
3,588,179
3,588,692
3,588,828
3,588,889
3,588,907
55 : 3,587,126
3,587,156
3,587,165
3,587,177
3,587,227
3,587,314
3,587,329
3,587,390
3,587,542
3,587,544
3,587,550
3,587,579
3,587,706
3,587,754
3,587,826
3,587,827
3,587,873
3,587,874
3,587,984
3,587,987
3,588,147
3,588,203
3,588,394
3,588,435
3,588,479
3,588,578
3,588,636
3,588,644
3,588,645
3,588,653
3,588,674
3,588,714
3,588,779
3,588,790
56 : 3,587,571
3,587,741

U.S. GOVERNMENT PRINTING OFFICE: 0—1971

U. S. DEPARTMENT OF COMMERCE
Maurice H. Stans, *Secretary*

PATENT OFFICE
William E. Schuyler, Jr., *Commissioner*